USSR

RYBAL'CHENKO, M. K. (deceased), et al., Fizika i Khimiya Obrabotki Materialov, No 2, Mar/Apr 73, pp 120-127

can be considered to be solved. Thermodynamic compatibility exists among very few materials, such as Cu/W, Cu/Mo, Ag/W, while the majority of materials are thermodynamically incompatible. Chemical compatibility can be achieved by developing new alloys compatible with a given hardening agent, finding new hardening agents that would be thermodynamically stable with respect to a given matrix, producing coatings on hardening agent for securing its compatibility with the matrix, and developing natural coatings by the in situ method. The most reliable of these ways are the first two.

2/2

Composite Materials

USSR

UDC 620.1

RYBAL'CHENKO, M. K., (DECEASED), USTINOV, L. M., Institute of Metallurgy imeni A. A. Baykov, Academy of the USSR, Moscow

"Effect of Fiber-Matrix Interfaces on the Ductility and Strength of Fiber Compositions"

Kiev, Problemy Prochnosti, No 9, Sep 72, pp 48-52

Abstract: The authors investigate the effect of the fiber-matrix interface on the ductility and strength of fiber composites with a monodirectional structure of the matrix-fiber system and a strong bond between components. It is found that the properties of fiber composite materials (and in particular the ductility and strength) are determined by three basic components: matrix, fibers, and matrix-fiber interface. The ductility of fiber composites is in all cases lower than the ductility of the matrix and higher than the ductility of the fibers. The ductility of composite changes nonadditively as a function of the percentage content of fiber and matrix as a whole. The basic cause for this nonadditive change in ductility is the fiber-matrix interfaces. As the density of the interfaces increases, i. e. as the fibers become finer, there is an increase in the fraction of nonadditive variation in ductility, and the additive variation characterized by the

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USSR

RYBAL'CHENKO, M. K., USTINOV, L. M., Problemy Prochnosti, No 9, Sep 72, pp 48-52

ductility of the fibers and matrix decreases. The interfaces in the overall ductility of the **composite** play a dual role, reducing the ductility of the matrix and increasing the ductility of the fibers. The interfaces retard the constriction of reinforcing fibers, which make the greatest contribution to the increase in strength of **composite** over that calculated by the rule of additivity at a high coefficient of strain hardening.

2/2

USSR

UDC 669.71:539.4

KOP'YEV, I. M., USTINOV, L. M., Moscow

"Method of Selecting Reinforcement Fibers to Produce Fibrous Composites With Predetermined Strength Properties"

Moscow, Fizika i khimiya obrabotki materialov, No 2, Mar-Apr 72, pp 97-99

Abstract: Proposed is a new method of selecting and proportioning fibers to produce composite materials with predetermined strength properties. Equations are derived expressing tensile strength, tensile to rupture, modulus of elasticity, and specific weight of compositions of multioriented discrete or continuous structures. A solution to a problem is cited for strengthening a matrix to a given strength, modulus of elasticity, and specific weight using the derived equations and conditions for proportioning fibers with appropriate property values. The method does not claim complete accuracy in predicting the strength characteristics of composites but offers a means for selecting combined pairs of materials and fibers which (aside from factors unrelated to strength) permits meeting the problem in principle. 1 illustration, 3 1/1 bibliographic references

Composite Materials

USSR UDC 539.4.019.2:669.71

RYBAL'CHENKO, M. K., and USTINOV, L. M., Moscow

"Fiber Composite Materials Based on Aluminum Alloys"

Moscow, Fizika i Khimiya Obrabotki Materialov, No 5, Sep-Oct 70, pp 97-106

Abstract: The article is a survey of results, reported in the literature, of experimental studies of the mechanical properties of aluminum-base fiber composites. Composites based on aluminum alloys with the following macrostructures are known at the present time: a) unidirectional continuous, b) unidirectional discrete, c) multidirectional discrete, d) multidirectional continuous. Fabrication methods include powder metallurgy, pressure treatment, diffusion welding, plasma spraying, casting and vacuum impregnation, electrolytic deposition, explosive welding. The following are at present the most promising composites based on aluminum alloys: a) Al alloy/stainless steel wire, b) Al/SiO_2 -- fibers, c) Al alloy/Be -- wire, d) Al/Al_2O_3 -- "whiskers," e) Al/B -- fibers. The last two systems are especially promis-

USSR

RYBAL'CHENKO, M. K., and USTINOV, L. M., Fizika i Khimiya Obrabotki Materialov, No 5, Sep-Oct 70, pp 97-106

ing. These composites have higher specific strength and elastic modulus values than high-strength aluminum alloys. The reinforcement of aluminum alloys with high-strength fibers as a whole increases resistance to fatigue rupture, creep resistance, long-time strength, impact strength and, in some cases, damping capacity. All mechanical properties of aluminum-base composites depend to a considerable extent on fabrication process parameters. Changing one of the parameters may impair some properties of a material and at the same time improve others.

2/2

1/2 020 UNCLASSIFIED PROCESSING DATE--04DEC70

TITLE--STRENGTH DIAGRAMS OF FIBROUS COMPOSITION MATERIALS WITH A UNIDIRECTIONAL STRUCTURE -U-

AUTHOR-(02)-IVANOVA, V.S., USTINOV, L.M.

u

COUNTRY OF INFO--USSR

SOURCE--IZVEST. AKAD. NAUK SSSR, METALLY, MAR.-APR. 1970, (2), 176-180

DATE PUBLISHED--------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--MECHANICAL STRENGTH, FIBER COMPOSITE, REINFORCED MATERIAL, NONFERROUS METAL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3007/1277 STEP NO--UR/0370/70/000/002/0176/0180

CIRC ACCESSION NO--AP0136683

UNCLASSIFIED

2/2 020 UNCLASSIFIED

CIRC ACCESSION NO--AP0136683 PROCESSING DATE--04DEC70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE THEORY OF THE STRENGTH DIAGRAMS OF COMPOSITION MATERIALS (FIBRE REINFORCED METALS) WITH A UNIDIRECTIONAL STRUCTURE IS PRESENTED. FOUR POSSIBLE TYPES OF GRAPH RELATING THE STRENGTH OF THE MATERIAL AS A WHOLE TO THE PROPORTION OF FIBROUS REINFORCING PHASE ARE DERIVED. THE CONDITIONS REQUIRED FOR THE REINFORCEMENT OF A SOFT METAL WITH FIBRES OR WIRES OF VARIOUS DIA. TO BE EFFECTIVE ARE CONSIDERED.

UNCLASSIFIED

USTINOV, V. A.

SO: FOREIGN PRESS DIGEST
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COMPUTERS
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71. USSR

UDC 002.513.5:681.3

BALAPANOV, Ye., KACHURINA, O. K., KIRDYASHKIN, A. P., KUSKOV, B., LYAN, E. N., USTINOV, V. A., TAZHIBAYEV, B. B., TRET'YAKOV, V. V., and FEDOROV, V. V.

"The MS-1 Information Retrieval System"

Tr. In-ta Mat. i Mekh. AN KazSSR (Works of the Institute of Mathematics and Mechanics of the Academy of Sciences, Kazakh SSR), No 1, 1970, pp 298-302 (from R-Zh -- Informatika, No 4, Apr 71, Abstract No 71.4.169 (71R--1250))

Translation: An approach to the creation of a system for collection, storage, and processing of technological information from a controlled process is described. One variant of an information retrieval system is presented. It includes technical resources, the organization of information arrays in computer storage, and a complex of programs for processing information.

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JPRS 57008
6-73

XIV-15. STRESSES AND STRUCTURAL DEFECTS IN EPITAXIAL SOLID SOLUTIONS OF GaPAs

[Article by V. M. Ustinov, B. G. Zakharov, G. V. Bol'shakova, A. A. Matvesh, Kaluga, Novosibirsk, III Simpozium po Protsessam Rosta i Sinteza Poluprovodnikovykh Kristallov i Plenok, Russian, 12-17 June 1972, p 207]

A study was made of the causes of the occurrence of stresses and structural defects in epitaxial layers of solid solutions of GaPAs.

Measurements were made of the bending of the structures at different temperatures, and the difference of the coefficients of thermal expansion of the substrate and the films with different composition of the solid solutions was determined. The dislocation structure of the solid solutions was investigated.

It was demonstrated that the stresses causing bending of the structures were caused both by the difference of coefficients of thermal expansion of the film and the substrate and inhomogeneity of the distribution of the composition of solid solutions with respect to depth of the epitaxial layer. The dislocation structure of the epitaxial solid solutions was basically caused by local inhomogeneities of the composition and also the stresses as a result of the difference in the coefficient of thermal expansion of the film and the substrate.

USTINOV, V.M.

1/2 028 UNCLASSIFIED PROCESSING DATE--27NOV70

TITLE--RAISING THE WEAR RESISTANCE OF ,CARBON, STEEL BY VIBRATIONAL HARDENING TREATMENT -U-

AUTHOR-(02)-BABICHEV, A.P., USTINOV, V.P.

COUNTRY OF INFO--USSR

SOURCE--FIZ. KHIM. MEKHAN. MAT., 1970, 6, (1), 13-15

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--CARBON STEEL, WEAR RESISTANCE, VIBRATION EFFECT, SURFACE HARDENING, ABRASIVE/(U)ST45 CARBON STEEL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3002/1798 STEP NO--UR/0369/70/006/001/0013/0015

CIRC ACCESSION NO--AP0129166

UNCLASSIFIED

2/2 028 UNCLASSIFIED PROCESSING DATE--27NOV70

CIRC ACCESSION NO--AP0129166

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECT OF VIBRATIONAL TREATMENT ON THE WEAR RESISTANCE OF QUENCHED C STEEL (ST. 45) WAS STUDIED. THE VIBRATIONAL TREATMENT WAS APPLIED TO THE C STEEL SAMPLES IN ABRASIVE MEDIA, CONSISTING, FOR EXAMPLE, OF HARDENED METALLIC SPHERES 9 MM IN DIA.; THIS HARDENED THE SURFACE LAYERS AND ELIMINATED INHOMOGENEITIES, THE MICROHARDNESS OF THE SURFACE LAYER INCREASING BY SIMILAR TO 50PERCENT. THE WEAR RESISTANCE UNDER CONDITIONS OF ROLLING AND SLIDING FRICTION ROSE SUBSTANTIALLY.

UNCLASSIFIED

Transformation and Structure

USSR

UDC 621.9.048.6

BABICHEV, A. P., and USTINOV, V. P., Institute of Agricultural Machinery, Rostov-on-Don

"Increasing the Wear Resistance of Steel by Superfinish Hardening Vibratory Tumbling"

Kiev, Fiziko-Khimicheskaya Mekhanika Materialov, Vol 6, No 1, Jan-Feb 70, pp 13-15

Abstract: There are various methods for the finish hardening of machine parts (fine turning, grinding, diamond burnishing, shot peening). The effectiveness of these methods in increasing the support power, wear resistance, and life of parts has been established through numerous laboratory studies and has been proven by practical industrial application. Data are given on the wear of hardened 45 steel after vibratory tumbling with hardened steel balls, 9 mm in diameter. As the duration of tumbling is increased, the roughness peaks gradually flatten out and the cavities are filled in. Vibratory tumbling increases the microhardness of the surface layer 40 to 50 μ deep. The maximum of microhardness is attained after 120 min of tumbling. The treatment described appears to reduce the wear of specimens on rolling friction.

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USSR

UDC 669.295:621.762

USTINOV, V. S., OLESOV, YU. G., ANTIPIN, L. N., and DROZDENKO, V. A.

"Powder Metallurgy of Titanium"

Moscow, Poroshkovaya Metallurgiya, Titana, Izd-vo Metallurgiya, 1973, 248 pp

Translation of Introduction: Accelerated scientific and technical progress requires the creation of materials which satisfy the most diverse requirements of consumers. The methods of powder metallurgy are beginning to occupy an ever increasing place in the creation of such materials. In its time powder metallurgy has played a decisive role in the development of titanium production; the first finished products of titanium were produced by the methods of powder metallurgy. Later, because of the sharp increase in the quality of the metallothermic titanium sponge and the introduction of a vacuum-arc smelting technique, practically all semi-finished and finished products have begun to be manufactured from cast metal. This was also due to the fact that titanium was basically used in special branches of technology where the determining factors were guaranteed high mechanical and physical properties of the finished products, and questions of cost played a secondary role. Recently the powder metallurgy of titanium has received increasingly broader application in many branches of the national economy. The simplicity of the

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USSR

USTINOV, V. S., et al., Poroshkovaya Metallurgiya Titana, Izd-vo Metallurgiya, 1973, 148 pp

technological scheme of this production, the possibility of a broad mechanization and automation of the processes, and the sharp increase in the output of suitable products all make powder metallurgy economically feasible, especially if we take into account the relatively high cost of titanium and the familiar difficulties involved in the question of treating waste. The development of powder metallurgy of titanium is associated with the necessity of organizing the production of powders which in their quality would satisfy the growing requirements of consumers and have a relatively low cost. The properties of titanium powders vary in significant ranges as a function of the method used to produce them. At the present time we are familiar with a rather large number of variations in the technological schemes for producing titanium powders (1). The basic ones are electrolysis of melts with a soluble anode from the titanium waste, grinding of solid titanium, and metallothermic reduction of titanium compounds and have been introduced on an experimental-industrialscale; they make it possible to produce titanium powders and its 2/ 9

USSR

USTINOV, V. S., et al., Poroshkovaya Metallurgiya Titana, Izd-vo Metallurgiya, 1973, 248 pp.

alloys which have been successfully tested by a number of consumers. The quality of the titanium powders plays a special role in the production of semi-finished and finished products from them with properties that are comparable to finished products produced from cast titanium. In this case a slight increase in the cost of the powders is often economically justified. For example, by the use of electrolytic powders that are more expensive than sponge titanium, an industrial technology has been created for the production of a number of structural parts using the methods of powder metallurgy. In this case the savings per 1 ton of finished products is 8-12 thousand rubles, with a cost for the electrolytic powder that is twice the cost for titanium sponge of higher grandes (2). A number of finished products on a titanium base may be produced only by the methods of power metallurgy; highly porous bodies, titanium-metalloid systems, several alloys on a titanium base, etcetera. Recently a new, effective method has appeared for the manufacture of materials by rolling or extrusion of the original powder batch, as a result of which we can economically manufacture such products as sheets, wire, pipes, and other titanium semi-finished products by omitting the operations of smelting the metal, casting the billets, and their subsequent treatment. For example, the

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USTINOV, V. S., et al., Poroshkovaya Metallurgiya Titana, Izd-vo Metallurgiya, 1973, 248 pp

production of an additional electrode material for the welding of titanium may be accomplished by the extrusion of titanium powders with significant simplification of the technology, increase in the quality of the electrodes and reduction in their cost as compared with the manufacture by ordinary methods (3). Thus, power metallurgy of titanium is becoming one of the important directions in the development of the titanium industry. This monograph critically examines the domestic and foreign research work in the field of producing titanium powders and alloys on its base; the features and degree of perfection of the technology according to the different methods are taken into account.
The authors express their appreciation to Professor A. B. SUCHKOV, Doctor of Technical Sciences, who made a number of valuable critical comments in reviewing the manuscript, and we shall be grateful to the readers who will express their own wishes and comments.

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USSR

USTINOV, V. S., et al., Poroshkovaya Metallurgiya Titana, Izd-vo Metallurgiya, 1973, 248 pp

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USSR

UDC 669.295.054.79

ANTIPIN, L. N., DROZDENKO, V. A., KOYGUSHSKIY, N. N., OLESOV, Yu. G., USTINOV, V. S., ZAPADNYA, V. I., VOLYNSKIY, V. V., and KALUZHSKAYA, E. L.

"The Technology for Obtaining Powders by the Electrolysis Method for Liquid Metals With a Soluble Anode"

Moscow, Metallurgiya i Khimiya Titana (Institut Titana), Metallurgiya Publishing House, Vol 6, 1970, pp 85-89

Translation: A technological chart for producing powders of titanium and its alloys by the electrolysis method with a soluble anode is worked out. Opitmal technological conditions for obtaining powders by electrolysis are selected. The chart has been adopted for introduction. The titanium powders obtained do not differ, in impurity content, from the best grades of titanium sponge. The effect of electrolyte temperature on the qualities of the metal obtained and the chlorine content in it are studied. The metal obtained is undergoing testing by users. Two illustrations, two tables, and two bibliographic entries.

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USSR UDC 621.762.27

RUBTSOV, A. N., OLESOV, Yu. G., USTINOV, V. S., KISELEV, O. G., CHERKASHIN, V. I., and GLUKHOV, V. P., Dnepr Titanium-Magnesium Plant

"Production of Powders of Titanium Alloys and Refractory Titanium-Based Compounds From Titanium Alloy Waste"

Kiev, Poroshkovaya Metallurgiya, No 12, Dec 70, pp 18-23

Abstract: The method of electrolytic refining of titanium wastes can be used to produce high-quality titanium powder for further production use. Studies have established the following optimal electrolysis mode: anode and cathode current density 0.2-0.3 and 2.6-2.8 a/cm^2 respectively; temperature 870-890°C; cathode precipitate growth time 0.5-1 hr; titanium concentration in electrolyte 0.5-0.7%. The authors studied the production of electrolytic titanium powders from titanium sponge waste under near-optimal conditions. The quality of the electrolytic titanium powder was higher than that produced by hydride calcium thermal methods. Dehydrogenated powders of VT5 and VT6 alloys were produced, corresponding to the initial alloys in chemical composition.

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USSR UDC 669.295-492.8

VOROB'YEV, B. YA., OLESOV, YU. G., USTINOV, V. S., PETRUN'KO, A. N., KONOVALOV, V. K., and ZAPADNYA, V. I.

"Assembly-Line Manufacture of Construction Parts From Titanium Powder by the Metal-Ceramic Process"

Moscow, Tsvetnyye Metally, No 7, Jul 70, pp 65-66

Abstract: The titanium powder discussed in this article is made from reworking the wastes formed in the production of parts and semi-finished titanium materials by an electrolytic refining process. The article describes the metal-ceramic method by which the powder is first pressed into bricks and baked in a vacuum at 1100° C. The materials for the finished parts is then pressed on P-472, P-474, and D-2334 hydraulic equipment with a force of 100-250 tons, used normally for the production of plastic parts. The process for producing the finished parts is described and the hourly rates for making disks, rings, and flanges 57 mm in diameter and 12-15 mm high, are specified. The article is illustrated with a cross-sectional sketch of the modernized EVT-15 vacuum oven in which the parts are baked before finishing. Dimensions of the oven are given in this sketch,

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VOROB'YEV, B. YA., et al., Tsvetnyye Metally, No 7, Jul 70, pp 65-66

and the various parts identified. A photograph of some of the parts manufactured by the metal-ceramic process is also shown.

USSR

UDC: 669.295-492

USTINOV, V. S., LOBANOV, V. S., OLESOV, Yu. G., KANYUK, A. I., and ZAPADNYA, V. I.

"Technical-Economic Problems and Prospects in the Development of Titanium Powder Metallurgy"

Moscow, , Tsvetnyye Metally, No 8, Aug 70, pp 73-76

Abstract: The factor which has prevented the wide use of titanium has been the high cost of parts made from castings of the metal. In the industrial production of such parts and semi-finished products from titanium castings, 70-80% of the furnace charge is waste. Nor can the waste be reprocessed to bring it up to standard. However, the metal-ceramic method of producing such parts lends itself readily to automation, and the waste is less than 25% of the weight of the finished part. Thus, the economy in materials and labor is reflected in a substantial reduction of the production costs. One metallurgical plant (unidentified) has a method for recovering titanium dioxide with calcium hydride. The titanium powder then obtained, with a grain size of less than 40 microns, contains 0.2-0.3% H, 0.04-0.07 C, 0.05-0.08 Ca, 0.2-0.35 of Fe and Ni, 0.006 Cl, 0.2-0.25 O. The powder is used in

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USTINOV, V. S., et al., Tsvetnyye Metally, No 8, Aug 70, pp 73-76

electronics production as a getter, for the production of porous filters, and other products. Such products, however, suffer from poor mechanical properties because of the high content of impurities. Hydrogenation is a likely method of titanium powder production. The resulting powder is large-grained, but can be broken down to any desired size. Its wastes can be reprocessed on a large laboratory scale. Electrolysis of titanium production wastes with a soluble anode is also a promising method for obtaining titanium powder. The quality of the powder is good and the process is adaptable to industrial conditions of production. The authors present the results of computations they have made of the anticipated production costs of these methods.

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USSR

UDC 621.762.2

ANTIPIN, L. N., DROZDENKO, V. A., KOYGUSHSKIY, N. N., OLESOV, YU. G., USTINOV, V. S., ZAPADNYA, V. I., VOLYNSKIY, V. V., and KALUSHSKAYA, E. L.

"Technology of Production of Powders by Electrolysis of Melts With Soluble Anode"

Sb. tr. Vses. n.-i. i proyektn. in-t titana [Collected Works of All-Union Scientific-Research and Planning Institute for Titanium], 6, 1970, pp. 85-89, (Translated from Referativnyy Zhurnal-Metallurgiya, No. 1, 1971, Abstract No.1 G456 by the authors).

Translation: A technological plan is developed for the production of Ti and titanium alloy powders by electrolysis with a soluble anode. The optimal technological mode is selected for electrolytic powder production. The plan has been accepted for use. The Ti powders produced are equal in impurity content to the best types of Ti sponge. The influence of electrolyte temperature on properties of the Ti produced and on content of Cl is studied. The Ti produced has passed consumers' tests. 2 figures; 2 tables.

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USSR

UDC: 621.762.274:669.295.5'71

OLESOV, YU.G., MEYERSON, G.A., USTINOV, V.S., ZAPADNYA, V.I., SEMYAYEVA, N.P., and CHERKASHIN, V.I.

"Electrolytic Derivation of Titanium-Based Alloy Powders"

Moscow, Tsvetnyye Metally, No 5, May 70, pp 79-81

Abstract: Investigations were made of the possibility of obtaining titanium-alloy powders by electrolysis of melts with a soluble anode. Titanium-aluminum alloys were used as examples. The first experiments were conducted on a large laboratory electrolyzer (current up to 300 amps). A mixture of A5-aluminum and ChM-titanium sponge wastes was used as the anode material. Aluminum content in the charge was varied from 10 to 40%. The cathodic deposits were processed by a hydrometallurgical method, separated into four fractions: +0.56, -0.56 + 0.14, -0.14 + 0.07 and -0.07 mm, and analyzed for Al, Fe, Si, C, N, and O content. On the basis literature data and the investigations conducted, optimum conditions were determined: anode current density of 0.1-0.15 amp/cm^2, cathode current density of 0.8-1 amp/cm^2, and electrolyte composed of 40% $MgCl_2$, 35% KCl, and 25% NaCl containing 1-1.5% dissolved titanium in the form of lower chlorides. Subsequent investigations were conducted under plant conditions. After hydrometallurgical processing and drying, the cathode material was separated into +0.5, -0.5 + 0.08, and -0.08 mm fractions. It was established that with a rise in the aluminum

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OLESOV, YU.G., et al, Tsvetnyye Metally, No 5, May 70, pp 79-81

content in the starting material, the yield of fine particles grows. As a result of the experiments conducted, the basic technological parameters of obtaining titanium-aluminum powders in existing electrolyzers were determined: cell current of 3-3.5 kiloamperes, anode current density of 0.2-0.25 amp/cm^2, 1-1.5% soluble titanium concentration in an $MgCl_2$ -- KCl -- NaCl -- $TiCl_x$ electrolyte, working temperature of the melt at 550-580°C, and unit electrolysis time at 2-3 hours. These parameters ensure a stable current efficiency of 0.45-0.50 g/amp·hr and an 80-85% yield of metal powder fractions after disintegration. The data obtained from the experiments indicate that by electrolysis of melts with a soluble anode, it is possible to obtain powders from titanium-aluminum alloys of determined composition which possess adequately high mechanical properties in the baked state.

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USSR

Titanium

UDC 669.295

KANYUK, A. I., OLESOV, Yu. G., and USTINOV, V. S.

"Economic Effectiveness of Titanium Powder Metallurgy"

Moscow, Tsvetnyye metally, No 5, May 72, pp 68-70

Abstract: A review is presented of the titanium industry in recent years and the effective utilization of cermets in the most advanced technological sectors, including the production of porous cermets (filters, getters, etc.), compact parts and intermediate products, and anticorrosive titanium powder coatings. Titanium cermet filters produced from electrolytic and hydrocalcium powder as well as from sponge waste have been widely used in the nonferrous metallurgy, chemical pharmaceutical, and food industries The capacity of porous Ti for gas absorption promoted its potentials for sputter-ion super-high vacuum. General Electric Company initiated the mass production of bearing housings for GET73 turbojet engines from unalloyed titanium powder produced from titanium sponge. The cost of bearing housings produced by hot powder pressing is 25-30% lower than that of similar parts--by forging of rods. The titanium institutes have come out with a new type of anticorrosive coating based on epoxy resin with titanium powder as the filler. The new coating offers high corrosion

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KANYUK, A. I., et al, Tsvetnyye metally, No 5, May 72, pp 68-70

resistance, chemical stability, high adhesion to metal and concrete, high bearing strength (2000 kg/cm^2), long service life, and biological inertness. The economic effectiveness per ton of electrolytic powder used in the anticorrosive coating amounts to 8000-9000 roubles yearly. The article further outlines the production cost aspects of titanium powder and the enormous potentials of titanium powder metallurgy. (1 table, 13 bibliographic references)

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USTINOV V.S.

Powder metallurgy

JPRS 58217

13 February 1973

ECONOMIC EFFECTIVENESS OF POWDER METALLURGY OF TITANIUM

UDC 669.295

[Article by A. I. Kanyuk, Yu. G. Olesov, V. S. Ustinov; Moscow, Tsvetnyye Metally, Russian, No 5, 1972, pp 68-71]

Powder metallurgy, in its time, played the deciding role in the development of the titanium industry; today it is again established as one of the most important trends in the development of the titanium industry. With powder metallurgy methods the raw materials can be used most efficiently, subsequent mechanical processing operations can be minimized, various compositions with given porosity, strength, heat- and corrosion resistance can be produced. Compared with the manufacture of parts from compacted metal, the use of powder metallurgy methods reduces wastes 5-7 times. All of this makes powder metallurgy an economical process, particularly as regards titanium, considering its relatively high cost and known difficulties involved in recycling wastes.

Expansion of effective use of powders and products made from them in the most advanced fields of industry, the most important of which we will also discuss, has also had an enormous impact on the development of titanium powder metallurgy.

Porous Cermets (Filters, Getters, and so forth)

Metal ceramic titanium filters made of electrolytic and hydrocalcium powders and also of sponge wastes are used successfully in nonferrous metallurgy, chemistry, pharmaceutical and food industries.

The quality of filtrate, and consequently of industrial final products, is improved by using titanium filters for filtering titanium tetrachloride from vanadium oxytrichloride -- complete filtration of solid suspension is achieved and the vanadium concentration does not exceed 0.001%; the filtration of magnesium decreases the iron concentration in it by 30-40%, decreases the hardness of titanium sponge by 7 HB units; by filtering nickel pulp (pH = 3-5, t = 65-80°C) the fineness of filtration is increased to 30 micron. Porous tubes (35-40% porosity; small fractions of sponge wastes are the initial material) also exhibit good filtering properties in the filtration of suspensions of the alumina industry [1-3].

USSR

ALEKSEYEV, A. G., USTINOV, V. V.

UDC 621.375.4

"Analysis of the Stability of the Operating Conditions of Amplifiers with Feedback Made of Field Transistors"

Materialy nauchno-tekhn. konferentsii. Leningr. elektrotekhn. in-t svyazi. Vyp. 2 (Materials of the Scientific and Technical Conference. Leningrad Electrotechnical Communications Institute Vyp. 2), Leningrad, 1970, pp 176-179 (from RZh-Radiotekhnika, No 8, Aug 70, Abstract No 8D57)

Translation: A simple and sufficient universal procedure based on directional graphs is used to calculate the stability of the operating conditions of amplifiers with direct current feedback in which channel transistors are used.

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UDC 534.86

USSR

MADORSKIY, V. V., USTINOV, YU. A.

"Evaluating the Homogeneity of the Mechanical Stress Field in Piezoceramic Discs"

V sb. P'yezoelektrich. materialy i preobrazovateli (Piezoelectric Materials and Converters -- Collection of Works), Rostov-na-Donu, Rostov University, 1971, pp 65-80 (from RZh-Fizika, No 3, Mar 72, Abstract No 3Zh556)

Translation: The problem of stress distribution in a piezoceramic disc located between washers under an external, one-dimensional stress normal to the faces of the disc is solved. The problem is solved with and without consideration of friction between the washers and the sample. The solution was obtained by elasticity theory methods with simplifying assumptions: (1) the piezoceramic is isotropic; (2) the washers are absolutely rigid; (3) the coefficient of friction between the washers and the piezoelement is independent of pressure. Analysis of the solution shows that the smaller the relative thickness of the sample, the broader the region of the homogeneous stress field and that for small values of the coefficient of friction the stresses in the disc are practically homogeneous. S. A. Yausheva.

1/1

UDC 621.3.049.75

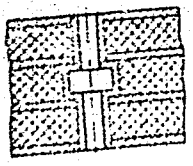
USSR

SHIKHAYEV, K. N., USTINOV, Yu. A., ZHIGALOV, A. T., ZHAK, L. I., MAKHMUDOV, M.

"A Method of Making Coupling Holes in Multilayered Printed-Circuit Boards"

Moscow, Otkrytiya, izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, No 2, Jan 71, Author's Certificate No 290493, division H, filed 24 Feb 69, published 22 Dec 70, p 170

Translation: This Author's Certificate introduces a method of making coupling holes in multilayered printed-circuit boards. As a distinguishing feature of the patent, the area of contact between the conductors of inner layers of the printed circuit board and the metallizing cap is increased by making the coupling holes with a stepped shape by predrilling the holes in the insulating liners with a diameter greater than that of the holes made after the boards have been assembled and pressed.



UDC: 621.376.43

USSR

ALEKHIN, V. A., USTINOV, Yu. D.

"Singularities in the Design of Pulse-Phase Detectors Used in Digital Frequency Synthesizers"

V sb. Materialy Nauchno-tekhn. konferentsii prof.-prepodavat. sostava Khar'kov. in-ta radioelektron. (Materials of the Scientific and Technical Conference of the Professional and Teaching Staff of the Khar'kov Institute of Radio Electronics), Khar'kov, Khar'kov University, 1969, pp 70-73 (from RZh-Radiotekhnika, No 12, Dec 70, Abstract No 12D47)

Translation: The authors propose two circuit modifications of a pulse--phase detector for a digital frequency synthesizer with phase AFC of the synchronized oscillator. The detectors convert a sequence of duration--modulated pulses before filtration to amplitude-modulated pulses with subsequent detection by a key peak detector. This makes it possible to simplify the low-frequency filter which isolates the DC component of the pulse voltage proportional to the phase difference of the voltages being compared. N. S.

1/1

USSR

USTINOV, Yu. K.

"The Spaces of Dynkin Entrances to Markov Processes"

Tr. Sib. fiz.-tekhn. in-ta pri Tomsk. un-te [Works of Siberian Institute of Physics and Technology at Tomsk University], 1973, No 63, pp 216-221, (Translated from Referativnyy Zhurnal - Kibernetika, No 8, 1972, Abstract No 8 V47 by M. Shur)

Translation: Certain conditions are indicated for which the phase space of a markov process is naturally included in the space of entrances in the sense of Ye. B. Dynkin (RZhMat, 1972, 1V94). Conditions are presented such that the markov process, a transform of a given markov process with a certain mapping of the phase space, has a space of entrances isomorphic to the space of entrances of the original process.

1/1

USTINOV, Yu.S.

ELECTRICAL DISCHARGE BETWEEN COAXIAL COPPER ELECTRODES

(4)

JPRS 61504

18 March 1974

EXPERIMENTAL STUDY OF THE CHARACTERISTICS OF ELECTRICAL DISCHARGE BETWEEN COAXIAL COPPER ELECTRODES IN A MAGNETIC FIELD

[Article by V. I. Alferov, O. N. Vitkovskaya, Yu. S. Ustinov, G. I. Shcherbakov, Moscow, Teplofizika Vysokikh Temperatur, Russian, Vol 11, No 6, 1973, signed to press 4 July 1972, pp 1142-1146]

The results of experimental investigations of electrical discharge in the annular gap between cooled copper electrodes are presented in this article. The experiments were conducted at pressures of 0.5-7 kgs/cm² with magnetic induction of 0.1-1 T, current of 400-1,000 A and electrode gap of 10-20 mm. Empirical formulas are presented for determination of discharge voltage and discharge velocity in an annular gap.

Electrical discharge, rotating in an annular gap in a transverse magnetic field, is used extensively at the present time in preheaters of aerodynamic systems and in various chemical industry installations. However the characteristics of such discharge, determined by various authors [1-5], especially the velocity and volt-ampere characteristics, vary substantially. The existing experimental results were obtained for narrow ranges of change of magnetic field and discharge current, basically at atmospheric pressure. Inscribed in this article are studies of discharge characteristics at pressures less than and greater than atmospheric, and with discharge stabilized by means of a magnetic lens. This method of stabilization eliminates axial movement and deformation of the discharge channel, which reduce pulsations of current and discharge voltage and variations of the rate of rotation. In addition, an increase of magnetic induction in the radial direction prevents shunting of discharge.

Experimental Method. The experimental investigations were conducted on an apparatus representing a coaxial plasmatron with discharge rotated by a magnetic field. The apparatus is described in detail in [6]. The diameter of the external copper electrode is 80-90 mm and the diameter of the central electrode is 50-60 mm, which provides for variation of the electrode gap from 10 to 20 mm.

[I - USSR - F]

(Biblio)

The investigations were conducted in air at flow rates G = [illegible] and $\cdot 10^{-3}$ kg/s, pressures p = 0.5-7 abs.atm, currents I = 100-1,000 A and magnetic induction B = 0.1-1 T. The distribution of the axial component of the magnetic field in the discharge zone is illustrated in Figure 1 for various coil currents.

The solenoid that developed the magnetic field was powered either consecutively with the discharge or from an independent power source. In the latter case the equivalent active and inductive resistances were included in the discharge power circuit.

During experiments the gas flow rate, chamber pressure, current and voltage of discharge and magnetic induction were measured. Current and voltage were recorded with N-004, N-105 and OK-17M oscillographs. High-speed photography of discharge with an SFR-2M camera was conducted synchronously with recordings of discharge current and voltage using a scheme that precluded the possibility of double exposure [7].

Figure 1. Distribution of axial component of magnetic field in discharge zone for various coil currents: 1 -- 100 A; 2 -- 400; 3 -- 600; 4 -- 1,000; discharge zone is cross hatched.

Experimental Results. Analysis of data gained from the films of discharge revealed that even for B ≥ 0.1 T the discharge zone is not a distinct pinched column, but is blurred in the direction of rotation so that its width is of the same order of magnitude or greater than the electrode gap. As the magnetic induction increases at constant current and pressure, the rate of rotation of the discharge zone increases and the width of the zone in the direction of rotation and its structure remain the same.

At currents of 400-600 A and pressure of 5-6 abs.atm the discharge gap does not have the characteristic contracted channel and the near-electrode regions glow more brightly than the discharge column. When pressure is decreased to 0.3 abs.atm the discharge zone expands in the direction of rotation, filling an increasingly larger part of the electrode gap, but its structure remains unchanged. At the same time the discharge velocity increases.

As current increases the discharge zone expands in the direction of rotation and the column begins to glow more brightly and is contractable with the glow of the near-electrode regions. The rate of rotation of discharge increases.

It may be concluded that when B ≥ 0.1 T discharge in the investigated range of currents and pressures cannot be considered an arc discharge in the

UDC 539.125.5

USSR

LAVRUKHINA, A. K., USTINOVA, G. K., MALYSHEV, V. V., and SATAROVA, L. M.

"Modelling Nuclear Reactions in an Isotropically Irradiated Thick Target"

Moscow, Atomnaya Energiya, Vol 34, No 1, Jan 73, pp 23-28

Abstract: An analytical method, previously developed by the authors, for calculating the intensity of cosmic radiation and the activity of cosmogenic isotopes at any point of an isotropically irradiated cosmic body of any size and any composition was used to simulate nuclear reactions in an isotropically irradiated thick target. In compliance with optimum dimensions for the development of nuclear cascade in iron, an iron sphere of 10 cm radius served as target. The sphere, rotating in two perpendicular planes, was irradiated by a 660-Mev proton beam. As a result of rotation, the surface of the sphere is irradiated isotropically. The activity of Na^{24} in thin aluminum plates and the activities of Mn^{52}, V^{48}, Sc^{44m}, Sc^{47}, and Ca^{47} in iron plates placed at various depths along the diameter of the sphere were measured. The experimental results are compared with curves calculated by the analytical method. It is shown that at a depth of $\sim$ 2 cm, the calculated activities are in quantitative agreement with experimental data. The depth distributions of cosmogenic isotopes in iron meteorites of various sizes are analyzed. A comparison with calculations by the Monte Carlo method is presented. Six figures, forty bibliographic references.

1/1

USSR

LAVRUKHINA, A. K.; USTINOVA, G. K.; MALYSHEV, V. V.; SATAROVA, L. M.

"Modelling Nuclear Reactions in Isotropically Irradiated, Thick Targets"

Moscow, Atomnaya Energiya; January, 1973; pp 23-8

ABSTRACT: While revolving about two mutually perpendicular axes, an iron sphere, having a radius of 10 cm, is irradiated by a 660-Mev proton beam. As a result of such rotation, the surface of the sphere is irradiated isotropically. The activity of Na^{24} in thin aluminum plates and Mn^{52}, V^{48}, Sc^{44m}, Sc^{47}, and Ca^{47} in iron plates placed at various depths along the diameter of the sphere was measured. The experimental results are compared with calculated curves obtained by an analytical method used for the analysis of activity in meteorites and lunar rocks. It was shown that at a depth of ~ 2 cm below the surface the activity calculated by the analytical method agrees quantitatively with the experimental results.

The laws governing the distributions of cosmogenic isotopes in iron meteorites of various sizes are analyzed. A comparison with calculations by the Monte Carlo method is presented.

The article includes six figures. There are 40 bibliographic references.

Radiation Chemistry

UDC 541.182.65:541.15

USSR

MAZINA, G. R., PANICH, R. M., USTINOVA, Z. M., VOYUTSKIY, S. S., FODIMAN, N. M., KRATSHTEYN, P. N., and KUZNETSOVA, G. I., Moscow Institute of Fine Chemical Technology imeni M. V. Lomonosov

"Effect of Ionizing Radiation on the Properties of Fluorine-containing Copolymer Latex"

Moscow, Kolloidnyy Zhurnal, Vol 33, No 5, Sep-Oct 71, pp 690-692

Abstract: The effect of ionizing radiation on the properties of fluorine-containing copolymer latex was studied by using Co^{60} as a source, the radiation dose ranging from 0.25 to 50 Mrad. The pH of the irradiated copolymer latex became lower, as did the resistance to electrolytes. After irradiation the coagulation threshold of the latex was also lowered with simultaneous coagulation of globules and intraglobular crosslinking of the polymer. Increased radiation dose resulted in greater three-dimensional lattice density. Irradiation of the latex does not lead to formation of intraglobular chemical bonds and to better film formation.

1/1

USSR

SAFARALIBEKOV, M. G., (Deceased), YAGODZINSKAYA, YE. M., MIRZOYEVA, N. M., LEYBZON, M. M. and USTINOVICH, V. N.

"Characteristics of the Clinical Course of Ornithosis"

Azerbaydzhanskiy Meditsinskiy Zhurnal, No 2, 1970, pp 71-74.

Translation: The clinical picture of ornithosis, incorrectly diagnosed as pneumonia or neurasthenia, was described for the first time in Azerbaydzhan (Agdzhabedinskiy rayon). Semi-wild pigeons were the source of infection. Serological and virological studies were conducted in the arbovirus laboratory of the VMIG Institute. Three of the 15 pigeons were serologically positive, and ornithosis virus was isolated from one of them, with characteristic intracellular inclusions in liver and spleen smears. Sera from the blood of a number of adult and child patients was positive with respect to ornithosis antigen. Three associates of the arbovirus laboratory became infected with ornithosis during the work and were subjected to thorough clinical, serological and biochemical study, after which catamnestic observations were conducted for two years.

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1/2 027 UNCLASSIFIED PROCESSING DATE--09OCT70

TITLE--POROUS POLIMERS AS ADSORBENTS AND SUPPORTS IN GAS CHROMATOGRAPHY -U-

AUTHOR-(04)-USTINOVSKAYA, I.A., GAVRILINA, L.YA., MALAKHOV, B.B., YANSHIN, YA.I.

COUNTRY OF INFO--USSR

SOURCE--IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR, NO 4, SERIYA KHIMICHESKIKH NAUK, 1970, NR 2, PP 18-22

DATE PUBLISHED--------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--POLYMER, ADSORPTION, GAS CHROMATOGRAPHY, POROSITY/(U)POLYSORBI POLYMER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1992/1377 STEP NO--UR/0289/70/000/000/0018/0022

CIRC ACCESSION NO--AP0112857

UNCLASSIFIED

2/2 027 UNCLASSIFIED PROCESSING DATE--09OCT70
CIRC ACCESSION NO--AP0112857
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. A GAS CHROMATOGRAPHIC BEHAVIOR POLYSORB-1 HAS BEEN INVESTIGATED. IT HAS BEEN SHOWN THAT POLYSORB-1 SHOULD BE CLASSIFIED AS A WEAKLY SPECIFIC SORBETN III TYPE BY KISELEV. POLISORB MAY BE USED FOR THE GAS CHROMATOGRAPHIC ANALISIS OF THE CATALITIC OXIDATION PRODUCTS. FACILITY: INSTITUT KATALIZA SO AN SSSR, NOVOSIBIRSK.

UNCLASSIFIED

1/2 CC9 UNCLASSIFIED PROCESSING DATE--30OCT70

TITLE--CHROMATOGRAPHIC DETERMINATION OF THE COMPOSITION OF A MIXTURE OF PRODUCTS OBTAINED DURING BURYRIC ACID SYNTHESIS -U-

AUTHOR-(03)-KOSTANYAN, G.G., USTYAN, L.O., MOVSISYAN, A.A.

COUNTRY OF INFO--USSR

SOURCE--ARM. KHIM. ZH. 1970, 23(2), 134-9

DATE PUBLISHED--------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--CHROMATOGRAPHY, BUTYRIC ACID, ALDEHYDE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3002/1503 STEP NO--UR/0426/70/023/002/0134/0139

CIRC ACCESSION NO--AP0128898

UNCLASSIFIED

2/2 009 UNCLASSIFIED PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0128698

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. OPTIMUM PARAMETERS FOR THE CHROMATOGRAPHIC DETN. OF RAW CROTONALDEHYDE (I) ARE AS FOLLOWS: COLUMN (4 M TIMES 6 MM INSIDE DIAM) PACKED WITH DIATOMACEOUS EARTH (0.25-0.50 MM) COATED WITH 23PERCENT POLYETHYLENE GLYCOL ADIPATE, COLUMN TEMP. 88DEGREES, CARRIER GAS H AT 4.5L-HR, DETECTOR CURRENT 120 MA. FOR THE ANAL. OF RAW BUTYRIC ACID (II) THE FOLLOWING CONDITIONS ARE RECOMMENDED: COLUMN TEMP. 135DEGREES, CARRIER GAS FLOW RATE 2.8L HR, 26PERCENT COLUMN COATING, DETECTOR CURRENT 140 MA. RELATIVE RETENTION VOLS. OF 17 AND 25 COMPONENT MIXTS. OF I AND II, RESP., ARE TABULATED. ANAL. TIME WAS 60-5 MIN, SENSITIVITY BASED ON ME SUB2 CO DETN. 0.001 WT.PERCENT.

FACILITY: GOS. NAUCH.-ISSLED. PROEKT. INST. POLIM. KLEEV, KIROVAKAN, USSR.

UNCLASSIFIED

USSR

UDC 537.311.33:546.24'48

ARONS, A.A., MATLAK, V.V., NIKONYUK, YE.S., UST'YANOV, V.I.

"Electrical Properties Of γ-Irradiated P-Type Cadmium Telluride"

V sb. Radiats. fiz. nemet. kristallov (Radiation Physics Of Nonmetallic Crystals-Collection Of Works), Vol 3, Part 2, Kiev, "Nauk.dumka," 1971, pp 54-66 (from RZh--Elektronika i yeyo primeneniye, No 10, October 1971, Abstract No 10B62)

Translation: The effect of γ-irradiation on the electrical properties of p-type CdTe irradiated at room temperature by γ-quanta of Co^{60} was studied. The investigation was conducted on single crystals of CdTe with concentrations of carriers (up to irradiation) at room temperature from $5 \cdot 10^{12}$ to 10^{14} cm^{-3} and the mobility of holes from 32 to 9 $cm^2 v^{-1} sec^{-1}$, respectively; γ irradiation of p-type CdTe leads to the appearance of radiation defects of acceptors, increasing the concentration of holes and changing the mechanism of scattering. 10 ill. 7 ref. I.V.

1/1

USSR

UDC 537.311.33:546.23'48

UST'YANOV, V.I., TARABROVA, L.I.

"Change Of Photoelectric Properties Of Cadmium Selenide With γ Irradiation"

V sb. Radiats. fiz. nemet. kristallov (Radiation Physics Of Nonmetallic Crystals-Collection Of Works), Vol 3, Part 2, Kiev, "Nauk.dumka," 1971, pp 78-91 (from RZh--Elektronika i yeye primeneniye, No 10, October 1971, Abstract No 10B59)

Translation: The change of the energy spectrum of the local levels in CdSe after irradiation by γ-quantum of Co^{60} was investigated as well as the character of this change and its cause. Shallow and deep levels were studied. The effect of γ radiation on the recombination processes in the crystal is established. Certain parameters are determined of crystals subjected to irradiation. 5 ill. 10 ref. I.V.

1/1

UDC 669.715:620.193

USSR

UST'YANTSEV, V. N., and SINYAVSKIY, V. S., Kamenets-Podol'sk Agricultural Institute

"Corrosion-Fatigue Strength of Aluminum Alloys as a Function of Chlorine Ion Concentrations, pH, and Temperatures of the Medium"

Kiev, Fiziko-khimicheskaya mekhanika materialov, Vol 8, No 1, 1972, pp 62-66

Abstract: Discussed here are the results of a study on intergranular corrosion, corrosion cracking, and corrosion fatigue of alloys of the systems Al-Cu-Mg (D16), Al-Cu-Si (AK8), and an experimental Al-Zn-Mg alloy containing 9% zinc and magnesium as well as additions of manganese. The corrosion rates were determined by complete immersion of the specimens in stirred electrolytes for 1000 hrs at room temperatures and for 240 hrs at elevated temperatures. Tests conducted over a wide range of pH, NaCl concentration, and electrolyte temperatures indicate that Al-Zn-Mg alloys have the highest corrosion resistance under overstress. However, their resistance to corrosion cracking markedly drops with increasing temperature of the medium, which, in the final analysis, appears to minimize the advantages. It is suggested that a corrosion fatigue-pH (of solution) plot would provide a more accurate rating of aluminum alloys for resistance to this type of corrosion over a fairly wide range of pH. (3 illustrations, 1 table, 6 bibliographic references)

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USSR UDC 669.715'721:620.186:669.018.8:669.018.8

KOL'TSOV, V. M., KISHMERESHKIN, I. G., GERSHTEYN, V. D., UST'YANTSEV, V. U., and PAVLENKO, Z. A.

"Influence of Certain Technological Factors on the Structure and Properties of AMg6 Alloy Sheet"

Tekhnol. legkikh splavov. Nauchno-tekhn. byul. VILSa (Technology of Light Alloys. Scientific and Technical Bulletin of the All-Union Institute of Light Alloys), 1970, No 3, pp 20-23 (from RZh-Metallurgiya, No 12, Dec 70, Abstract No 12 1752 by I. NABATOVA)

Translation: An investigation was made of the structure, mechanical properties, and corrosion resistance of cold-rolled, 1-, 2- and 4-mm-thick AMg6 alloy sheet as a function of variations in chemical composition, degree of deformation (5-50%), and annealing regime in a range of 230-500°. Sheet properties were not significantly affected by variation in chemical composition (within the limits of the All-Union State Standard) or in heating rate (50, 100, and > 1000 deg/hr) or in cooling rate (25, 50 deg/hr and air cooling). The maximum value of $\sigma_{0.2}$, viz., 20.5 kg/mm^2, was obtained with a deformation degree of 30% and an annealing temperature of 280°. Heating at 100° for 100 hours in the event of prior annealing at temperatures > 300° causes the evolution

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USSR

KOL'TSOV, V. M., et al, Tekhnol. legkikh splavov. Nauchno-tekhn. byul, VILSa (Technology of Light Alloys. Scientific and Technical Bulletin of the All-Union Institute of Light Alloys), 1970, No 3, pp 20-23 (from RZh-Metallurgiya, No 12, Dec 70, Abstract No 12 1752 by I. NABATOVA)

of particles of the Al-Mg phase over the grain boundaries and a lessening of corrosion resistance of the sheet. The combination of high corrosion resistance and satisfactory mechanical properties of the sheet is assured at an annealing temperature of 280-300°. Five illustrations. One table.

USSR UDC 669.715'721:620.186:669.018.8:669.018.8

KOL'TSOV, V. M., KISHMERESHKIN, I. G., GERSHTEYN, V. D., UST'YANTSEV, V. U., and PAVLENKO, Z. A.

"Influence of Certain Technological Factors on the Structure and Properties of AMg6 Alloy Sheet"

Tekhnol. legkikh splavov. Nauchno-tekhn. byul. VILSa (Technology of Light Alloys. Scientific and Technical Bulletin of the All-Union Institute of Light Alloys), 1970, No 3, pp 20-23 (from RZh-Metallurgiya, No 12, Dec 70, Abstract No 12 1752 by I. NABATOVA)

Translation: An investigation was made of the structure, mechanical properties, and corrosion resistance of cold-rolled, 1-, 2- and 4-mm-thick AMg6 alloy sheet as a function of variations in chemical composition, degree of deformation (5-50%), and annealing regime in a range of 230-500°. Sheet properties were not significantly affected by variation in chemical composition (within the limits of the All-Union State Standard) or in heating rate (50, 100, and > 1000 deg/hr) or in cooling rate (25, 50 deg/hr and air cooling). The maximum value of $\sigma_{0.2}$, viz., 20.5 kg/mm^2, was obtained with a deformation degree of 30% and an annealing temperature of 280°. Heating at 100° for 100 hours in the event of prior annealing at temperatures > 300° causes the evolution

1/2

USSR

KOL'TSOV, V. M., et al, Tekhnol. legkikh splavov, Nauchno-tekhn. byul, VILSa (Technology of Light Alloys. Scientific and Technical Bulletin of the All-Union Institute of Light Alloys), 1970, No 3, pp 20-23 (from RZh-Metallurgiya, No 12, Dec 70, Abstract No 12 1752 by I. NABATOVA)

of particles of the Al-Mg phase over the grain boundaries and a lessening of corrosion resistance of the sheet. The combination of high corrosion resistance and satisfactory mechanical properties of the sheet is assured at an annealing temperature of 280-300°. Five illustrations. One table.

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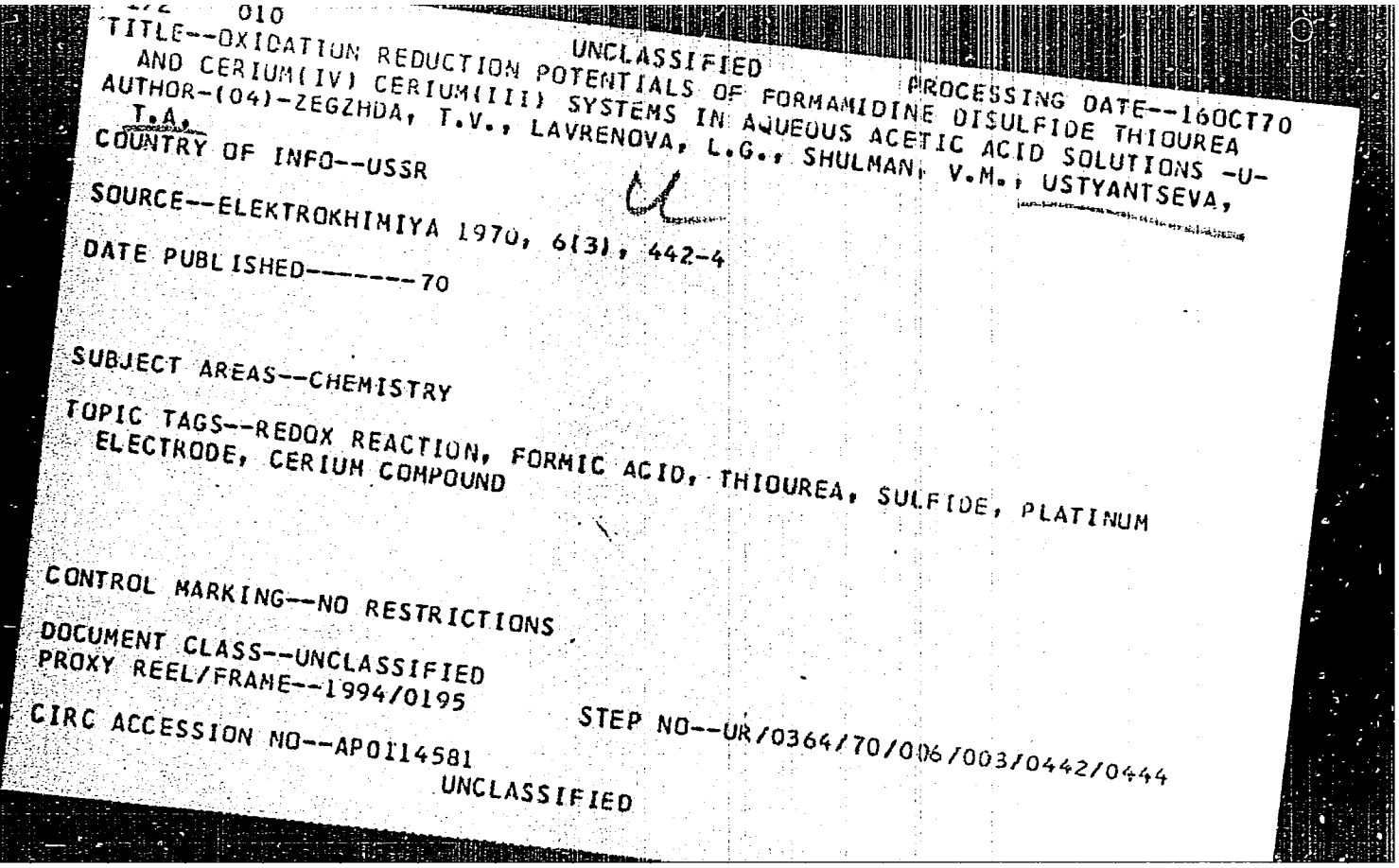

UNCLASSIFIED PROCESSING DATE--16OCT70

010

TITLE--OXIDATION REDUCTION POTENTIALS OF FORMAMIDINE DISULFIDE THIOUREA AND CERIUM(IV) CERIUM(III) SYSTEMS IN AQUEOUS ACETIC ACID SOLUTIONS -U-

AUTHOR-(04)-ZEGZHDA, T.V., LAVRENOVA, L.G., SHULMAN, V.M., USTYANTSEVA, T.A.

COUNTRY OF INFO--USSR

SOURCE--ELEKTROKHIMIYA 1970, 6(3), 442-4

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--REDOX REACTION, FORMIC ACID, THIOUREA, SULFIDE, PLATINUM ELECTRODE, CERIUM COMPOUND

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1994/0195

STEP NO--UR/0364/70/006/003/0442/0444

CIRC ACCESSION NO--AP0114581

UNCLASSIFIED

UNCLASSIFIED PROCESSING DATE--16OCT70

2/2 010
CIRC ACCESSION NO--AP0114581
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE REDOX POTENTIAL IN A CELL CONTG. FORMAMIDINE DISULFIDE ((H SUB2 NC (:NHIS) SUB2) THIOUREA AND N HCL AND 0-90PERCENT ACOH WAS MEASURED AT 25DEGREES WITH A PT AND GLASS ELECTRODES AND COMPARED WITH A CELL CONTG. CE PRIME4 POSITIVE:CE PRIME3 POSITIVE (AS SULFATES), N HCL, AND 0-80PERCENT ACOH. THE POTENTIAL OF THE FORMAMIDINE DISULFIDE THIOUREA SYSTEM IS PRACTICALLY INDEPENDENT OF THE SOLVENT COMPN. THE DATA FOR BOTH SYSTEMS ARE IN GOOD AGREEMENT WITH THOSE OBTAINED WITH THE SCE AND PT ELECTRODES. FACILITY: INST. NEORG, KHIM., NOVOSIBIRSK, USSR.

UNCLASSIFIED

USSR

UDC 542.957:547.559.77:547.559.78:547.1'118

NESMEYANOV, A. N., USTYNYUK, N. A., BOGATYREVA, L. V., and MAKAROVA, L. G., Institute of Element Organic Compounds, Academy of Sciences USSR

"Reactions of the Phenyl Derivatives of the Metal Carbonyls of Molybdenum and Tungsten With Triphenylphosphine and Triphenyl Phosphite"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, 1, Jan 73, pp 62-67

Abstract: The products of the reaction of $C_5H_5W(CO)_3C_6H_5(I)$ with $P(C_6H_5)_3$ and $P(OC_6H_5)_3$ -- e.g., $C_5H_5W(CO)_2LC_6H_5+CO$; $C_5H_5W(CO_2)LCO\ C_6H_5$; or $W(CO)_3L_3+\{C_5H_5\} + \{C_6H_5\}$ -- depend on the condition. (L is either of the P ligands). A series of C_{31} to C_{57} phospho derivatives of W and Mo were prepared and characterized by physical data, elemental composition, and spectral and NMR data. Stereochemistry, exchange of the ligands, and the effects of a limited number of solvents were considered.

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1/2 020 UNCLASSIFIED PROCESSING DATE--27NOV70

TITLE--NUCLEAR MAGNETIC RESONANCE SPECTRA OF ARENECYCLOPENTADIENYLIRON COMPOUNDS -U-

AUTHOR-(05)-NESMEYANOV, A.N., LESHCHEVA, I.F., USTYNYUK, YU.A., SIROTKINA, E.I., BOLESOVA, I.N.

COUNTRY OF INFO--USSR

SOURCE--J. ORGANOMETAL. CHEM. 1970, 22(3), 689-96

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY, NUCLEAR SCIENCE AND TECHNOLOGY

TOPIC TAGS--NMR SPECTRUM, IRON COMPOUND, CYCLIC GROUP, COMPLEX COMPOUND, ORGANIC PHOSPHATE, FLUORINE ISOTOPE, ELECTRON ACCEPTOR

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--2000/2130 STEP NO--NE/0000/70/022/003/0689/0696

CIRC ACCESSION NO--AP0125714

UNCLASSIFIED

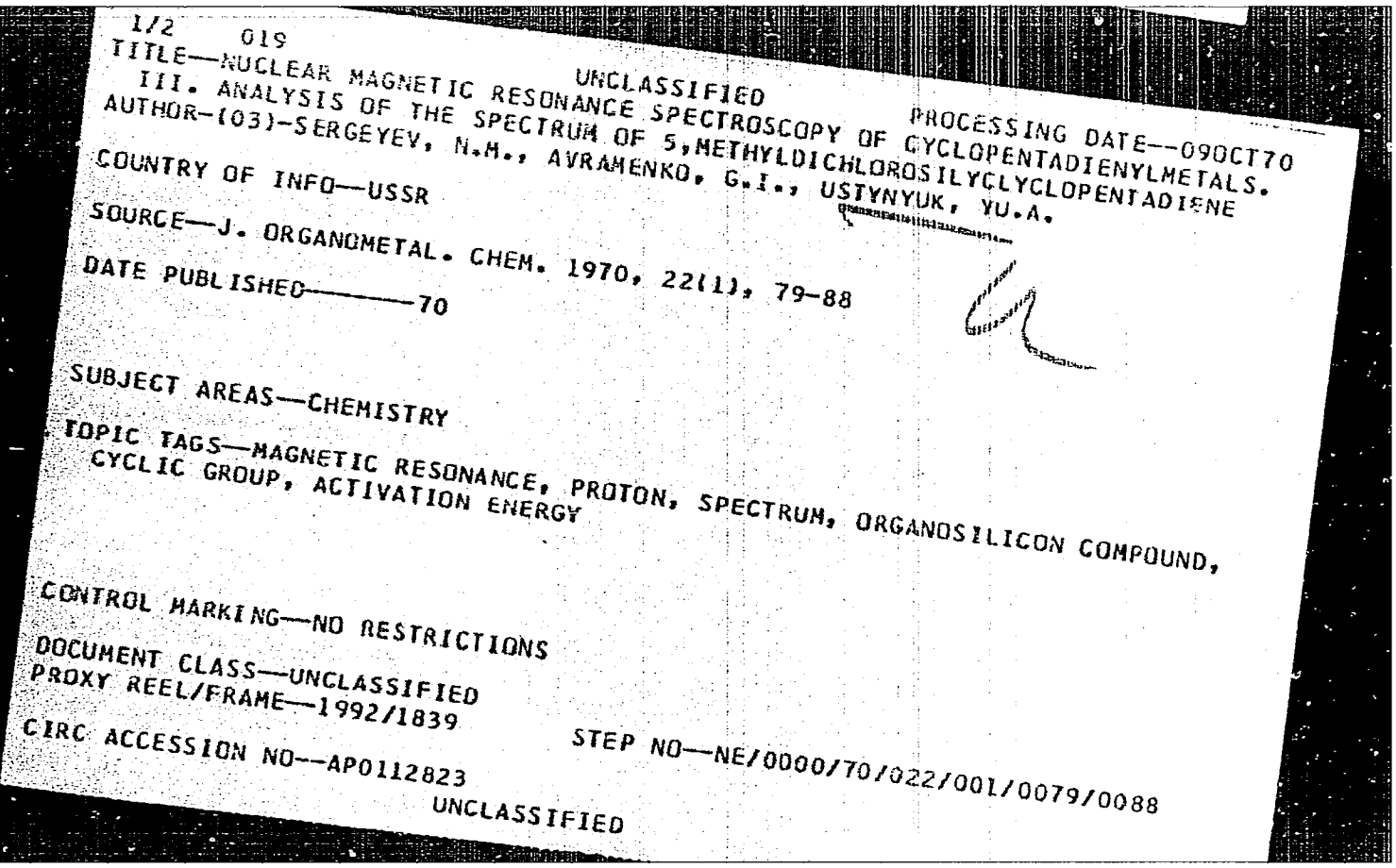
2/2 020 UNCLASSIFIED PROCESSING DATE--27NOV70

CIRC ACCESSION NO--AP0125714

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. PMR SPECTRA OF ARENECYCLOPENTADIENYLIRON COMPDS. (XPHFEC SUB5 H SUB5) PRIME POSITIVE PF SUB6 PRIME NEGATIVE, (RHO,XC SUB6 H SUB4 MEFEC SUB5 H SUB5) PRIME POSITIVE PF SUB6 PRIME NEGATIVE, (C SUB6 H SUB6 FEC SUB5 H SUB4 X) PRIME POSITIVE PF SUB6 PRIME NEGATIVE CONTG. VARIOUS SUBSTITUENTS X HAVE BEEN STUDIED. PMR CHEM. SHIFTS HAVE BEEN CORRELATED WITH THE SETS OF THE HAMMETT-TAFT SIGMA PARAMETERS. THE RESULTS ARE COMPARED WITH THOSE OBTAINED FOR THE NON COORDINATED ARENES OR WITH EARLIER DATA. HEXAFLUOROPHOSPHATES OF RHO OR M,FLUORODIPHENYLCYCLOPENTADIENYL IRON HAVE BEEN PREPD. AND THEIR PRIME19 F NMR SPECTRA ARE USED TO DET. SIGMA SUBI AND SIGMA SUBR PRIMED OF THE PH RING IN (C SUB5 H SUB5 FEC SUB6 H SUB6) PRIME POSITIVE PF SUB6 PRIME NEGATIVE WHICH DIFFERS FROM THE UNCOORDINATED PH IN THAT IT IS A STRONG ELECTRON ACCEPTOR.

FACILITY: INST. ORG.-ELEM. COMPD., MOSCOW, USSR.

UNCLASSIFIED



1/2 019 UNCLASSIFIED PROCESSING DATE--09OCT70

TITLE--NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY OF CYCLOPENTADIENYLMETALS. III. ANALYSIS OF THE SPECTRUM OF 5,METHYLDICHLOROSILYCLYCLOPENTADIENE

AUTHOR-(03)-SERGEYEV, N.M., AVRAMENKO, G.I., USTYNYUK, YU.A.

COUNTRY OF INFO--USSR

SOURCE--J. ORGANOMETAL. CHEM. 1970, 22(1), 79-88

DATE PUBLISHED----70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--MAGNETIC RESONANCE, PROTON, SPECTRUM, ORGANOSILICON COMPOUND, CYCLIC GROUP, ACTIVATION ENERGY

CONTROL MARKING--NO RESTRICTIONS

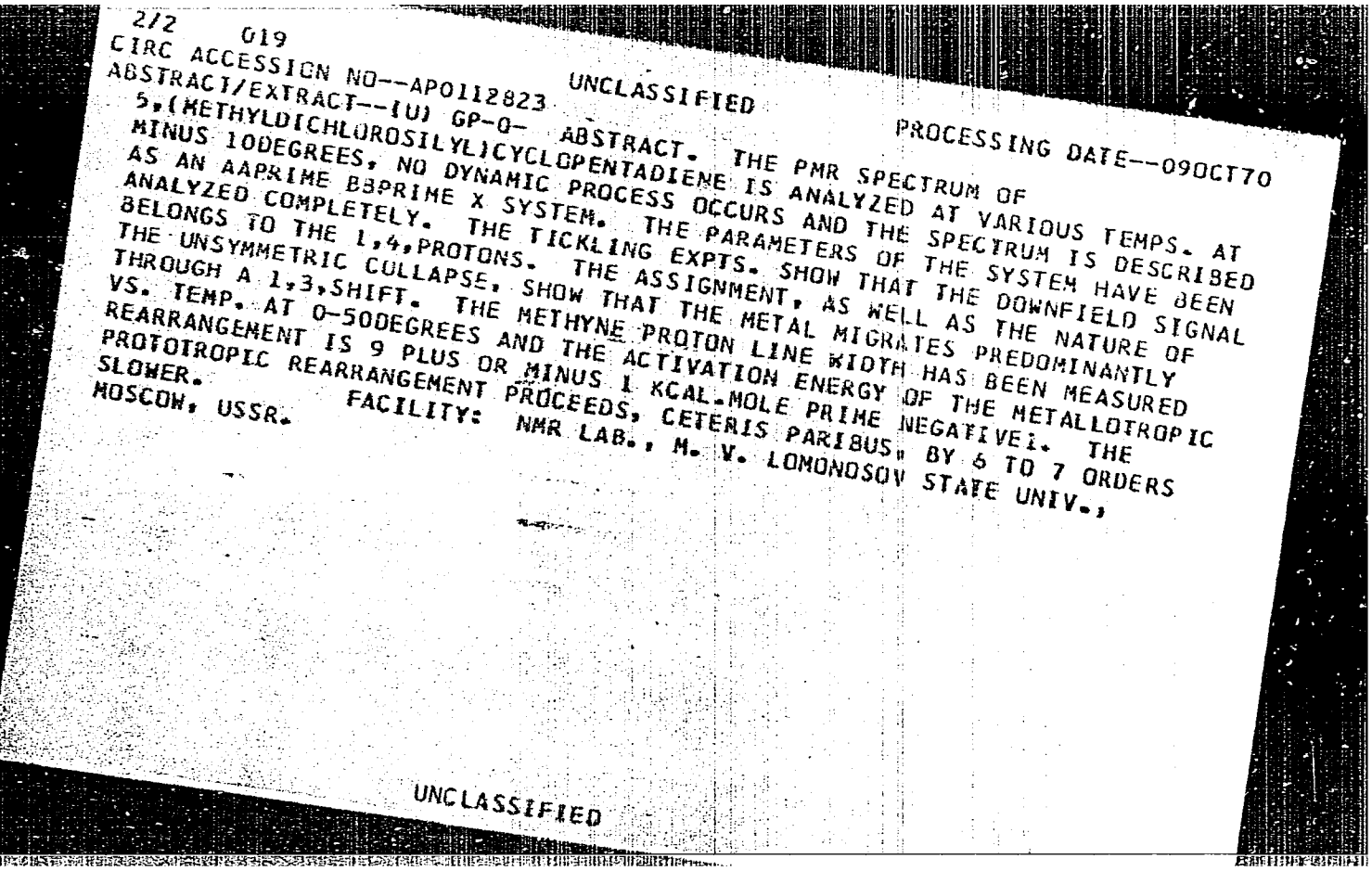
DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1992/1839

STEP NO--NE/0000/70/022/001/0079/0088

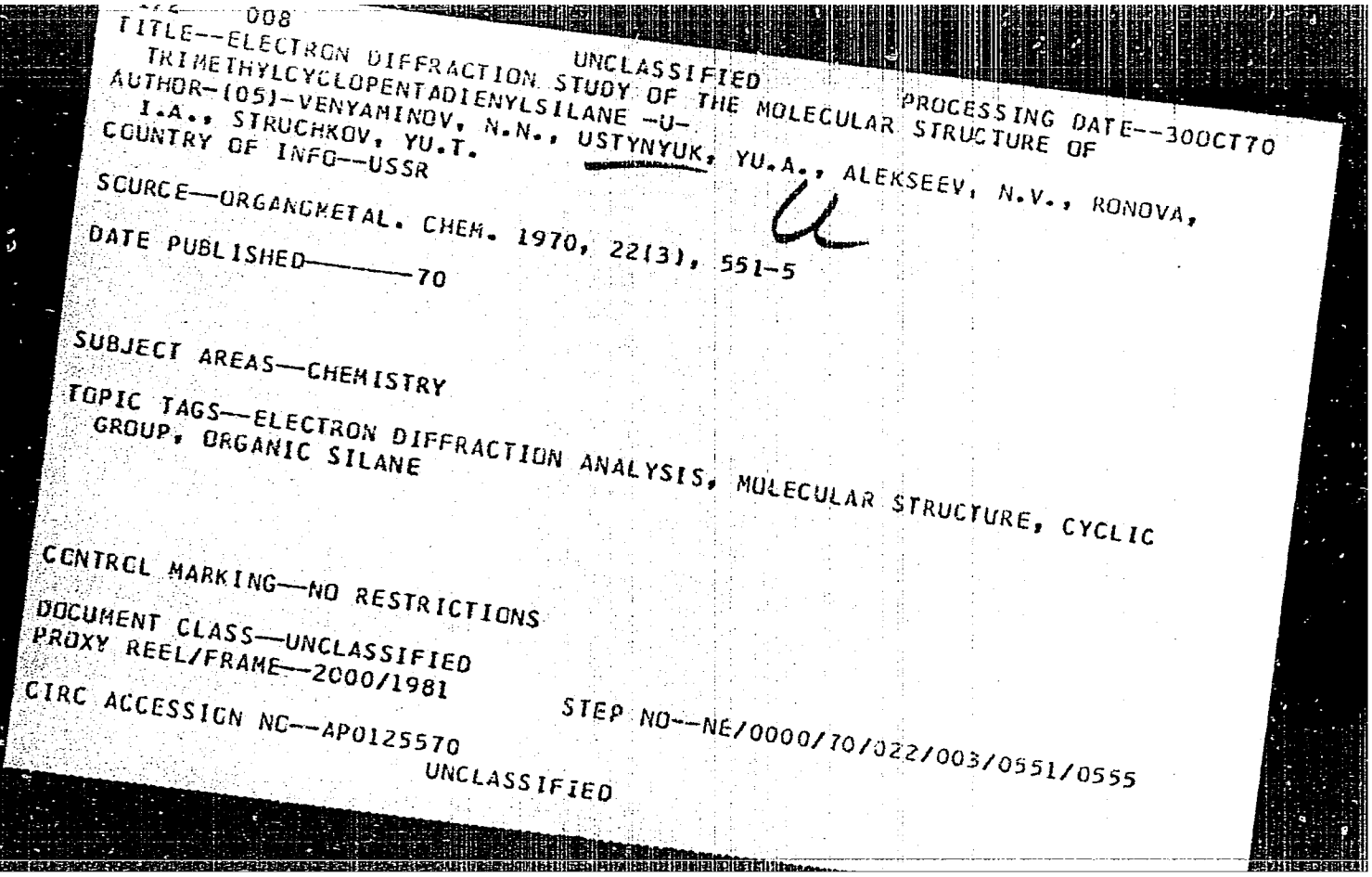
CIRC ACCESSION NO--AP0112823

UNCLASSIFIED



2/2 019 UNCLASSIFIED PROCESSING DATE--09OCT70
CIRC ACCESSION NO--AP0112823
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE PMR SPECTRUM OF 5,(METHYLDICHLOROSILYL)CYCLOPENTADIENE IS ANALYZED AT VARIOUS TEMPS. AT MINUS 100DEGREES, NO DYNAMIC PROCESS OCCURS AND THE SPECTRUM IS DESCRIBED AS AN AAPRIME BBPRIME X SYSTEM. THE PARAMETERS OF THE SYSTEM HAVE BEEN ANALYZED COMPLETELY. THE TICKLING EXPTS. SHOW THAT THE DOWNFIELD SIGNAL BELONGS TO THE 1,4,PROTONS. THE ASSIGNMENT, AS WELL AS THE NATURE OF THE UNSYMMETRIC COLLAPSE, SHOW THAT THE METAL MIGRATES PREDOMINANTLY THROUGH A 1,3,SHIFT. THE METHYNE PROTON LINE WIDTH HAS BEEN MEASURED VS. TEMP. AT 0-50DEGREES AND THE ACTIVATION ENERGY OF THE METALLOTROPIC REARRANGEMENT IS 9 PLUS OR MINUS 1 KCAL-MOLE PRIME NEGATIVE1. THE PROTOTROPIC REARRANGEMENT PROCEEDS, CETERIS PARIBUS, BY 6 TO 7 ORDERS SLOWER.
FACILITY: NMR LAB., M. V. LOMONOSOV STATE UNIV., MOSCOW, USSR.

UNCLASSIFIED



008 UNCLASSIFIED

TITLE--ELECTRON DIFFRACTION STUDY OF THE MOLECULAR STRUCTURE OF TRIMETHYLCYCLOPENTADIENYLSILANE -U-

PROCESSING DATE--30OCT70

AUTHOR-(05)-VENYAMINOV, N.N., USTYNYUK, YU.A., ALEKSEEV, N.V., RONOVA, I.A., STRUCHKOV, YU.T.

COUNTRY OF INFO--USSR

SOURCE--ORGANOMETAL. CHEM. 1970, 22(3), 551-5

DATE PUBLISHED----70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--ELECTRON DIFFRACTION ANALYSIS, MOLECULAR STRUCTURE, CYCLIC GROUP, ORGANIC SILANE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--2000/1981

STEP NO--NE/0000/70/022/003/0551/0555

CIRC ACCESSION NO--AP0125570

UNCLASSIFIED

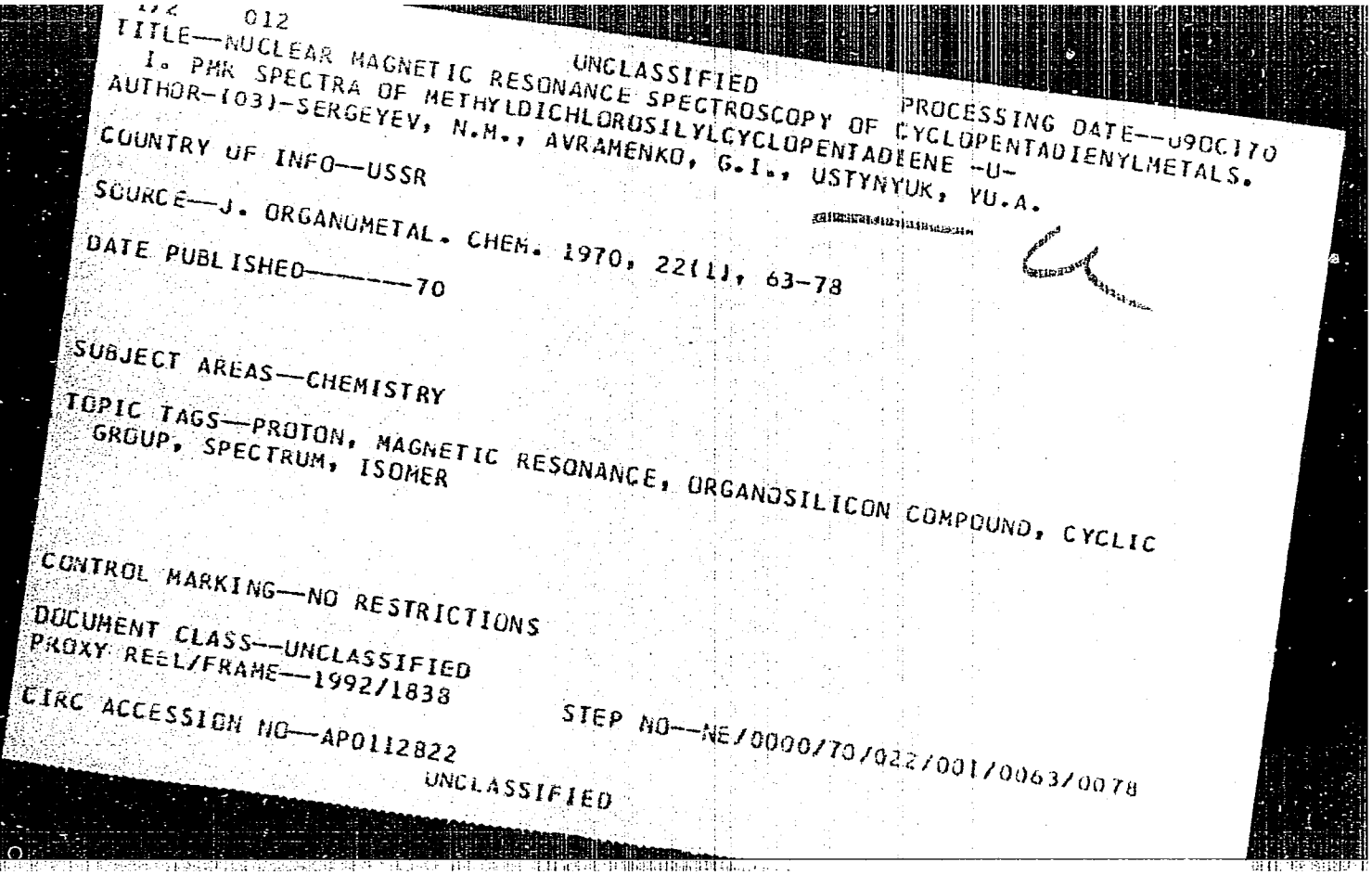
272 008

CIRC ACCESSION NO--AP0125570 UNCLASSIFIED PROCESSING DATE--30OCT70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE MOL. STRUCTURE OF TRIMETHYLCYCLOPENTADIENYLSILANE, C SUB5 H SUB5 SIME SUB3, HAS BEEN STUDIED BY ELECTRON DIFFRACTION IN THE VAPOR PHASE. THE SI ATOM IS BONDED BY THE LOCALIZED SIGMA BOND WITH ONE OF THE CYCLOPENTADIENYL CARBON ATOMS. THE SI-C BOND DISTANCES ARE 1.90 ANGSTROM. THE CYCLOPENTADIENYL RING HAS AN "ENVELOPE" CONFORMATION, THE DIHEDRAL ANGLE BETWEEN PLANAR 4 AND 3-MEMBERED FRAGMENTS OF THE RING BEING 220EGREES. THE SI-C BOND MAKES AN ANGLE OF 560EGREES WITH THE PLANE OF THE BENT OUT "ENVELOPE FLAP". ASSUMING THE QUALITY OF ALL C-H BOND LENGTHS AND ALSO OF THREE C-C BOND LENGTHS WITHIN THE PLANAR 4-MEMBERED FRAGMENT OF THE CYCLOPENTADIENYL RING, THE FOLLOWING VALUES ARE OBTAINED: GAMMA(C-H) EQUALS 1.11, GAMMA(C-C) EQUALS 1.53, GAMMA(C:C) EQUALS 1.40 ANGSTROM.

FACILITY: INST. ORG.-ELEM. COMPD., MOSCOW, USSR.

UNCLASSIFIED



012

UNCLASSIFIED

TITLE--NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY OF CYCLOPENTADIENYLMETALS. I. PMR SPECTRA OF METHYLDICHLOROSILYLCYCLOPENTADIENE -U-

PROCESSING DATE--09OCT70

AUTHOR-(03)-SERGEYEV, N.M., AVRAMENKO, G.I., USTYNYUK, YU.A.

COUNTRY OF INFO--USSR

SOURCE--J. ORGANOMETAL. CHEM. 1970, 22(1), 63-78

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--PROTON, MAGNETIC RESONANCE, ORGANOSILICON COMPOUND, CYCLIC GROUP, SPECTRUM, ISOMER

CONTROL MARKING--NO RESTRICTIONS

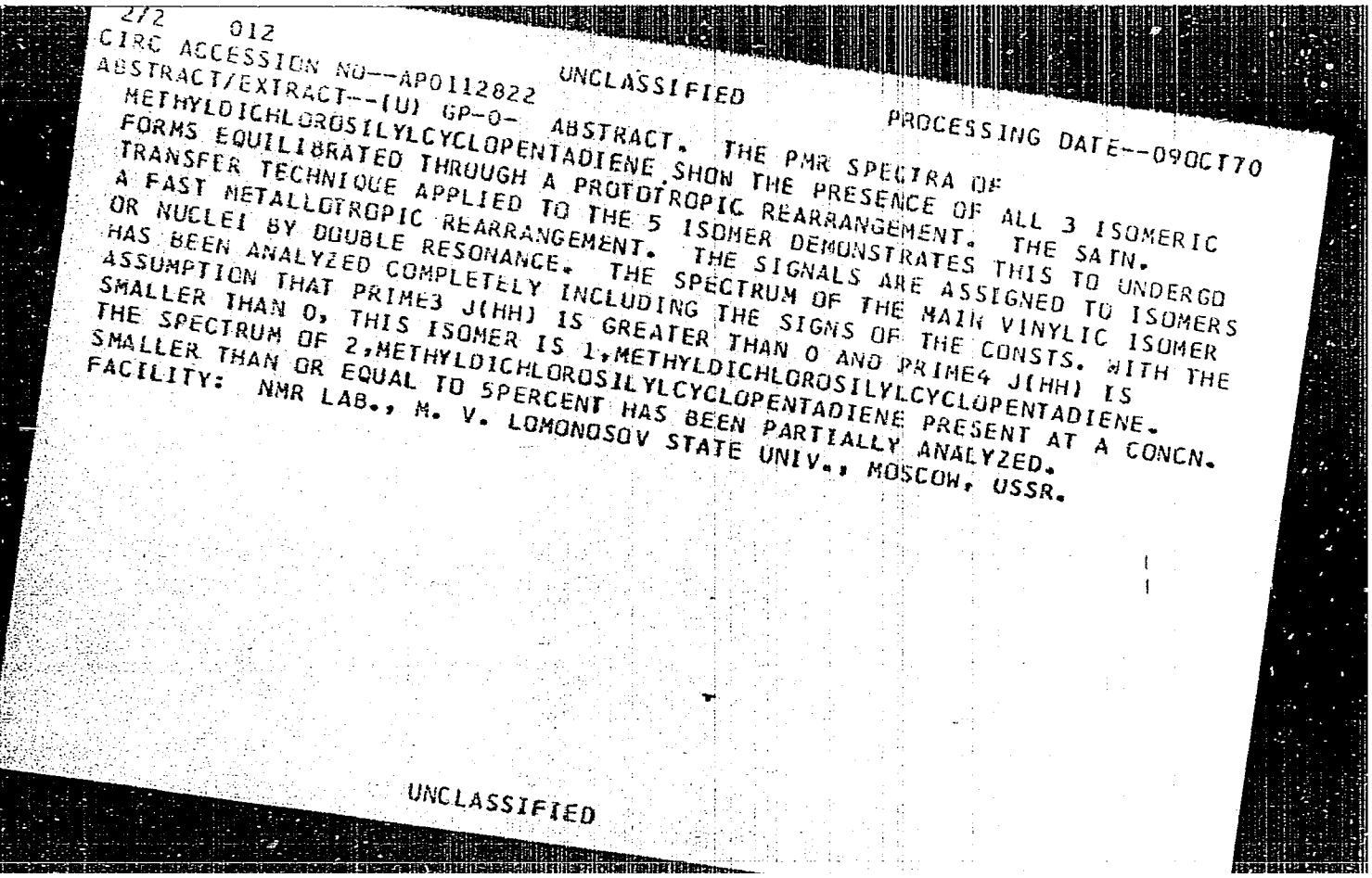
DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1992/1838

STEP NO--NE/0000/70/022/001/0063/0078

CIRC ACCESSION NO--AP0112822

UNCLASSIFIED



2/2 012 UNCLASSIFIED PROCESSING DATE--09OCT70
CIRC ACCESSION NO--AP0112822
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE PMR SPECTRA OF METHYLDICHLOROSILYLCYCLOPENTADIENE SHOW THE PRESENCE OF ALL 3 ISOMERIC FORMS EQUILIBRATED THROUGH A PROTOTROPIC REARRANGEMENT. THE SATN. TRANSFER TECHNIQUE APPLIED TO THE 5 ISOMER DEMONSTRATES THIS TO UNDERGO A FAST METALLOTROPIC REARRANGEMENT. THE SIGNALS ARE ASSIGNED TO ISOMERS OR NUCLEI BY DOUBLE RESONANCE. THE SPECTRUM OF THE MAIN VINYLIC ISOMER HAS BEEN ANALYZED COMPLETELY INCLUDING THE SIGNS OF THE CONSTS. WITH THE ASSUMPTION THAT PRIME3 J(HH) IS GREATER THAN 0 AND PRIME4 J(HH) IS SMALLER THAN 0, THIS ISOMER IS 1,METHYLDICHLOROSILYLCYCLOPENTADIENE. THE SPECTRUM OF 2,METHYLDICHLOROSILYLCYCLOPENTADIENE PRESENT AT A CONCN. SMALLER THAN OR EQUAL TO 5PERCENT HAS BEEN PARTIALLY ANALYZED.
FACILITY: NMR LAB., M. V. LOMONOSOV STATE UNIV., MOSCOW, USSR.

UNCLASSIFIED

1/2 009 UNCLASSIFIED PROCESSING DATE--02OCT70

TITLE--ELECTRON DIFFRACTION STUDY OF THE STRUCTURE OF (CH SUB3)SUB3 NEGATIVE GEC SUB5 H SUB5 CYCLOPENTADIENYLTRIMETHYLGERMANIUM -U-

AUTHOR-(05)-USTYNYUK, YU.A., STRUCHKOV, YU.T., ALEKSEYEV, N.V., VENYAMINOV, N.N., RONOVA, I.A.

COUNTRY OF INFO--USSR

SOURCE--ZH. STRUKT. KHIM. 1970, 11(1), 127-9

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--ELECTRON DIFFRACTION ANALYSIS, GERMANIUM COMPOUND, MOLECULAR STRUCTURE, COMPLEX COMPOUND, CYCLIC GROUP

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1987/0315

STEP NO--UR/0192/70/011/001/0127/0129

CIRC ACCESSION NO--AP0103970

UNCLASSIFIED

2/2 009 UNCLASSIFIED

CIRC ACCESSION NO--AP0103970 PROCESSING DATE--02OCT70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. ELECTRON DIFFRACTION INVESTIGATION OF THE TITLE COMPD. SHOWED THAT THE STRUCTURE CONTAINS A LOCALIZED SIGMA GE-C BOND BETWEEN THE C SUB5 H SUB5 RING AND THE GEME SUB3 GROUP. THE GE ATOM HAS TETRAHEDRAL ENVIRONMENT, WITH 4 EQUAL GE-C BONDS (1.97 ANGSTROM EACH) AND LIES IN A SYMMETRY PLANE OF THE C SUB5 H SUB5 RING. THE C SUB5 H SUB5 RING IS NOT PLANAR. ONE C ATOM LIES IN A PLANE FORMING A DIHEDRAL ANGLE OF 24 PLUS OR MINUS 4DEGREES TO THE PLANE OF OTHER FOUR C ATOMS, WHICH FORM A BUTADIENE LIKE GROUPING. THE GE-C BOND FORMS AN ANGLE OF 52 PLUS OR MINUS 4DEGREES TO THE PLANE CC(GE)C, THE THREE C ATOMS BEING A FRAGMENT OF THE C SUB5 H SUB5 RING. THE C-C BOND LENGTHS IN THE C SUB5 H SUB5 RING ARE 1.50 AND 1.46 ANGSTROM.

UNCLASSIFIED

Acc. Nr. AP0055672 Abstracting Service: CHEMICAL ABST 5/70

Ref. Code NE0000

105691r Nuclear magnetic resonance spectroscopy of metal-cyclopentadienyls. IV. Carbon-13 NMR spectra of sigma cyclopentadienyl compounds of silicon, germanium, and tin. Grishin, Yu. K.; Sergeev, N. M.; Ustynyuk, Yu. A. (NMR Lab., M. V. Lomonosov State Univ., Moscow, USSR). *J. Organometal. Chem.* 1970, 22(2), 361–4 (Eng). ^{13}C NMR spectra of Si, Ge, and Sn cyclopentadienyl compds. were studied. ^{13}C chem. shifts and $J(^{13}C\text{-}H)$ consts. verify the σ-structure of the compds. The variation of the ^{13}C NMR spectrum of $C_5H_5Ge(CH_3)_3$ with temp. shows that a fast metallotropic rearrangement occurs in this compd. at as low a temperature as 20°. ^{13}C NMR data are discussed with ref. to the structure of metal cyclopentadienyls.

RCLC

REEL/FRAME 19840981

SO: JPRS 53388
17 Jun 71

UDC 612.886.014.47

EVALUATING VESTIBULAR TOLERANCE

[Article by R. R. Gallo, B. V. Ustyushin, L. N. Gavrilova and E. I. Khelenskiy; Moscow, Kosmicheskaya Biologiya i Meditsina, Russian, Vol 5, No 1, 1971, pp 65-71]

Abstract: This paper gives an analysis of clinical symptoms, somatic (nystagmus and equilibrium function) and autonomic (systemic and retinal hemodynamics) components of vestibular responses of 54 healthy male test subjects examined using the Coriolis acceleration test. It also describes an approach to be used in evaluating human tolerance to vestibular stimulation. With this approach the test subjects can be classified as tolerant and intolerant to vestibular stimuli. Vestibular intolerance is suggested by the development of third-degree vestibular-autonomic reactions. With respect to the time of appearance and level of manifestation of the responses, it is suggested that three degrees of vestibular tolerance and three degrees of vestibular intolerance be discriminated, each of which can be characterized by certain clinical and physiological reactions. This approach to vestibular evaluations can be used in screening various types of personnel.

Evolution of the methods for expert evaluation of tolerance to vestibular effects is inseparably related to the development of means for motion. Whereas in the 1930's-1940's it was the so-called otolithic reaction (OR) and a test in biaxial swings which was most important and which entirely satisfied the requirements which at that time were imposed on flight personnel (V. I. Voyachek, 1946; K. L. Khilov, 1936), as a result of improvements in aviation and particularly with the development of space flight, methods for investigating tolerance to Coriolis accelerations are now assuming increasingly greater importance. Most researchers feel that tests revealing accumulation of Coriolis accelerations are more informative and more valuable for prognostic purposes than are other vestibular tolerance tests (S. R. Rankatova;

SO: JPRS 54396
05 Nov 71

UDC 612.84:612.014.47:531.113

STUDY OF OPTIC FUNCTIONS AND RETINAL CIRCULATION IN MAN EXPOSED TO COMPLEX ACCELERATIONS

[Article by E. S. Korova, L. A. Kitayev-Smyk, B. V. Ushkalov, Moscow, Kosmicheskaya biologiya i meditsina, Russian, Vol 5, No 4, pp 42-47, 1971, submitted for publication 10 August 1970]

Abstract: This paper presents the results of studies of retinal hemodynamics and optic functions in 30 healthy test subjects exposed to accelerations in 30 healthy. The tone of retinal vessels revealed regular changes which included variations of 12 to 72°/sec. artery and changes in diastolic pressure in the caliber of arteries and veins in dependence on the duration and intensity of acceleration. Optic functions proved to be sufficiently stable. The results show that retinal circulation, which to a certain extent reflects the state of cerebral circulation, may be used as a criterion of the effect of Coriolis accelerations on the human body.

The visual analyzer plays an extremely important role in man's life because 90 percent of all the information on his surroundings is received by eyo. During space flight, with man's exposure to a combination of unfavorable factors, including accelerations of variable intensity and direction, impairing functioning of the kinetic analyzer, the importance of the visual information channel is still further increased. The results of a study of the performance of cosmonauts during critical flights indicate a stability of vision under these conditions. However, in order to increase the reliability of work by cosmonauts in the designing of indicating and signalling systems for controlled space vehicles one must take into account the possible changes in functionings of the visual analyzer (Ye. M. Yugamov; E. S. Korova; Kitayev-Smyk; White, and others).

It is known that the state of visual functions is dependent to a considerable degree on blood supply to the retina. Ophthalmological investigations are assuming great importance in this connection since by the use of

USSR

UDC:669.18:-147:621.746

POLYAKOV, V. V., SHORSHIN, V. N., NEKHAYEV, V. P., KVITKO, M. P., SINEL'NIKOV, V. A., FILATOV, Yu. V., YUGOV, P. I., and USTYUZHANIN, V. D.

"Study of Technology of Melting in an Oxygen Converter and Pouring of Type K-7ϵ Rail Steel in a Continuous Casting Unit"

Proizvodstvo Chernykh Metallov [Production of Ferrous Metals--Collection of Works], No 75, Metallurgiya Press, 1970, pp 123-132

Translation: Results are presented from a study of a new, progressive metallurgical process--the production of railroad rails of high-quality ingots produced by continuous casting in combination with melting of rail steel in an oxygen converter.

It is assumed that the process is promising for further increases in the strength of railroad rails and reduction of the expense of their production. 5 figures; 4 tables; 5 biblio. refs.

1/1

USSR

USTYUZHANIN, V. V. UDC: 8.74

"Ordering of Seismograms in Computer Processing. The '1-Numeratsiya' Program. (Dscription, Instructions and Text of the Program)"

Tr. Zap.-Sib. n.-i. geologorazved. neft. in-t (Works of the West Siberian Scientific Research Institute of Geological Petroleum Prospecting), 1972, vyp. 55, pp 170-175 (from RZh-Kibernetika, No 10, Oct 72, abstract No 10V643 [author's résumé])

Translation: The paper describes the algorithms and operation of the "1-Numeratsiya" program. The program is formulated as a standard program in Minsk-22 computer codes. It is a component part of the interpretation algorithms, and may also be used for constructing an oriented graph and for enumerating its vertices.

1/1

USTYUZHANINOV, V.N. Micro Electronics

JPRS 57142

29 September 1972

UDC 621.395.6

QUALITY CRITERIA FOR THE DESIGN OF DISCRETE-ACTION MICROELECTRONIC DEVICES

[Article by V. N. Ustyuzhaninov; Kiev, Izvestiya Vuzov SSSR, Radioelektronika, Russian, 1972, Vol 15, No 6, signed to press 21 January 1971, pp 699-704]

A quantitative measure of the structural complexity of the functional diagram of microelectronic apparatus of the logic digital computer type is determined. The relation between the structural complexity of the functional diagram and design criteria of microelectronic devices is determined.

The design of microelectronic devices (MED) is divided into several basic stages according to the nature of problems to be solved. The sequence of MED design stages is examined in [1]. The quality of design at each of the basic stages is evaluated with the aid of a set of special criteria that govern the design, performance, technological and economic characteristics of MED. The quality criteria of the functional diagram and their relation to MED design criteria are examined in this work.

Any discrete-action MED can be viewed as a set of logic components and elementary terminal automatons, comprising a discrete automaton [2]. The combination part of such automaton combines a set of logic components and the memory part is comprised of a set of elementary automatons.

The functional diagram of a discrete automaton reveals the specific execution of the prescribed conversion of an input word to an output word. Usually an unlimited number of variations of functional diagrams of varying complexity can be synthesized for each such conversion. One of the basic forms of optimization of functional diagrams is synthesis of diagrams with the minimal number of elementary logic operations, corresponding to the minimal form of prescribed switching function [2].

We will examine the combination part of a discrete automaton. To determine the minimal form of functional diagram of the combination part we must introduce a quantitative measure of the structural complexity.

 [I - USSR - F]

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UDC: 621.375.421

USTYUZHANINOV, V. N.

"Using the Inductive Properties of Diodes to Correct the Front in Transistor Video Amplifiers"

Sb. nauchn. tr. Vladimir. politekhn. in-t (Collected Scientific Works of Vladimir Polytechnical Institute), 1970, vyp. 9, pp 97-104 (from RZh-Radiotekhnika, No 5, May 71, Abstract No 5D139)

Translation: The author discusses the possibility of using diodes which have the property of modulation of base conductivity under the effect of a jump in forward current for correcting the front of the amplified signal in a transistor video stage, and determines the effectiveness of such correction. Six illustrations, bibliography of two titles. Resumé.

1/1

USSR

UDC: 621.396.6-181.5

USTYUZHANINOV, V. N.

"Determining the Area of the Substrate of a Hybrid Thin-Film Microcircuit"

V sb. Mikroelektronika (Microelectronics--collection of works), Vyp. 3, Moscow, "Sov. radio", 1969, pp 344-348 (from RZh-Radiotekhnika, No 6, Jun 70, Abstract No 6V266)

Translation: The author calculates the areas taken up by the resistors and capacitors on the substrate surface in thin-film integrated circuitry. The computation takes account of the technological singularities of production of passive elements. The formulas given can be used to find the area of entire substrate by means of a utilization factor which is experimentally determined. V. P.

1/1

USSR

USTYUZHANINOV, V. N.

UDC: 621.396.6

"Criteria of Design Quality of Discrete Action Miniature Electronic Equipment"

Kiev, Izvestiya VUZ SSSR--Radioelektronika, No 6, 1972, pp 699-704

Abstract: A study is made of the quality criteria of miniature electronic equipment (MEE) and their interconnection with the structural indices of the equipment. Discrete action MEE may be considered a combination of logic elements and elementary finite automata forming a discrete automaton. The paper considers the combination part of the discrete automaton, and to determine the minimum form of its functional system introduces a quantitative measure of structural complexity. Also considered is the application of the quality criteria for MEE design to computation of the dimensional characteristics of the equipment if the latter is made up of hybrid film circuits. The author concludes that a quantitative measure of the complexity of functional transformations in logic elements can be obtained by using information theory, and that the normalization of the economic, structural, and operational characteristics of MEE can produce objective quality criteria of MEE design.

1/1

PHYSICS

Electricity & Magnetism

USSR

KOMIN, A. V., LOBANOV, K. M., and USTYUZHANINOV, V. G.

"Effect of an Electric Field on Particle Movement in a Stellarator"

Leningrad, Zhurnal Tekhnicheskoy Fiziki, Vol 40, No 7, 1970, pp 1,346-1,350

Abstract: The equipotential surfaces of the electric field in question in this article coincide with the magnetic surfaces of the stellarator. The method followed by the authors in making their calculations is to solve, by the Runge-Kutta method, the system of differential equations describing the motion of charged particles in the electric and magnetic fields. These equations are given in vector form. Since the exact analytic expression for the magnetic surfaces is unknown, the averaged magnetic surfaces experimentally corrected in the separatrix region to reduce the divergence between the true and equi-potential magnetic surfaces are used. The results of the computations indicate that the electric field strongly affects the particle trajectories. The authors express their gratitude to R. Z. Sagdeyev and A. A. Galeyev for thier useful comments.

1/1

USSR

UDC 665.658.2.661.715.7

SMOL'NIK, YU. YE., ZHURBA, A. S., USUPOVA, L. G., and KAPRUSH, R. V.
All Union Scientific Research Institute of Petrochemical Processing

"Hydrogenation of Aromatic Hydrocarbons of Narrow Fractions of Aviation Kerosene"

Moscow, Neftepererabotka i Neftekhimiya, No 2, 1972, pp 1-3

Abstract: Hydrogenation of aromatic hydrocarbons, fractions 130-180 and 180-240°C, on an industrial aluminum-platinum catalyst AP-56 was studied. The optimal conditions for this process are: pressure -- 40 atms, temperature -- 275-325°C. Under such conditions and at a 1.5 hr^{-1} volume rate of addition of starting material, the hydrogenation of both fractions exceeds 85%. The yield of the product is approximately 97 weight-%. The catalyst used is quite stable even after 200 hrs.

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1/2 023 UNCLASSIFIED PROCESSING DATE--23OCT70

TITLE--PHYSICOCHEMICAL AND TECHNOLOGICAL PROPERTIES OF PRILUKI AND RYBAL'SKII PETROLEUMS -U-

AUTHOR-(03)-CHEREONICHENKO, G.I., ZHURBA, A.S., USUPOVA, L.G.

COUNTRY OF INFO--USSR

SOURCE--NEFTEPERERAB. NEFTE KHIM. (MOSCOW) 1970, (3), 47

DATE PUBLISHED-------70

SUBJECT AREAS--EARTH SCIENCES AND OCEANOGRAPHY, MATERIALS, PROPULSION AND FUELS

TOPIC TAGS--KEROSINE, GASOLINE, JET FUEL, PETROLEUM DEPOSIT, GEOGRAPHIC LOCATION, PETROLEUM REFINING, PHYSICAL CHEMISTRY PROPERTY, CATALYTIC REFORMING

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3001/2081 STEP NO--UR/0318/70/000/003/0047/0047

CIRC ACCESSION NO--AP0127454

UNCLASSIFIED

2/2 023 UNCLASSIFIED

CIRC ACCESSION NO--AP0127454 PROCESSING DATE--23OCT70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. PRILUKI (15-27PERCENT NAPHTHENES AND 70PERCENT PARAFFINS) AND RYBAL'SKII LOW S PETROLEUMS FROM THE DNIEPER DONETS BASIN YIELDED 55.7 AND 67.0PERCENT OF LIGHT FRACTIONS, RESP., AND EQUIV. REFORMING CATALYZATES. IN THE RYBAL'SKII PETROLEUM, AROMATIC HYDROCARBON CONTENT IN THE 105-40DEGREES AND 140-240DEGREES FRACTIONS WAS 36.4 AND 28PERCENT, RESP., BUT PARAFFINIC HYDROCARBON CONTENT (26.8PERCENT IN THE 105-40DEGREES FRACTION) AND THE ISO NORMAL PARAFFIN RATIO WERE SO LOW (0.3-0.4 FOR THE 60-105 AND 120-40DEGREES FRACTIONS) THAT THE OCTANE NO. WAS 13-16 POINTS LOWER THAN THAT OF THE PRILUKI GASOLINE. RYBAL'SKII CRUDES YIELDED KEROSINE JET FUELS HAVING POOR LOW TEMP. AND FLAME CHARACTERISTICS AND ONLY LOW GRADE MAZUT BOILER FUEL. THUS, SEP. REFINING OF THE 2 PETROLEUMS WAS NECESSARY.

UNCLASSIFIED

USSR

UDC 62-72

1.

ZHURBA, A. S., SMOL'NIK, YU. YE., KATRUSH, R. V., SABIROVA, G. V., and USUPOVA, L. G., All Union Scientific Research Institute of Petrochemical Processing

"The Influence of the Depth of Hydropurification of the Fractions of Jet Fuel on Their Low Temperature Properties"

Kiev, Khimicheskaya Tekhnologiya, No 3,(63), May-Jun 72, pp 17-19

Abstract: The effect of the depth of hydrofining being used as the first stage of the hydrogenation process of jet fuels with increased content of aromatic hydrocarbons has been investigated in regard to the low temperature properties of the hydrofined fuel. It has been noted that after deep hydrofining the temperature of the initial crystallization is raised and a turbidity is observed proceeding the crystallization by some 12-14°C. It has been determined that this turbidity is caused by accumulation of poorly branched paraffin hydrocarbons of high molecular weight.

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1/2 020 UNCLASSIFIED PROCESSING DATE--20NOV70

TITLE--AMPERCMETRIC TITRATION OF FORMALDEHYDE AND FORMIC ACID -U-

AUTHOR-(02)-USVYATSOV, A.A., SOLOMATIN, V.T.

COUNTRY OF INFO--USSR

SOURCE--ZAVOD. LAB. 1970, 36(2), 154-5

DATE PUBLISHED--------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--AMPERCMETRIC TITRATION, FORMAL DEHYDE, FORMIC ACID, PLATINUM ELECTRODE, GRAPHITE, CHEMICAL LABORATORY APPARATUS/(U)AUI TITRATION APPARATUS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3004/2019 STEP NO--UR/0032/70/036/002/0154/0155

CIRC ACCESSION NO--AP0132280

UNCLASSIFIED

2/2 020 UNCLASSIFIED

CIRC ACCESSION NO--AP0132280 PROCESSING DATE--20NOV70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE AMPEROMETRIC TITRATOR AU-1 WITH PT OR GRAPHITE ROTATING ELECTRODE (900 RPM) WAS USED. DETN. OF FORMALDEHYDE IS BASED ON ITS OXIDN. TO FORMIC ACID BY AMMONIACAL SOLN. OF AG PRIME POSTIVE AND AMPEROMETRIC TITRN. OF EXCESS AG PRIME POSITIVE BY 0.01-0.05M K SUB4 FECN SUB6 AT 1.12 V. TOTAL FORMIC ACID (ORIGINALLY PRESENT PLUS PRODUCED BY OXIDN. OF FORMALDEHYDE) IS OXIDIZED BY 10 ML 0.05-0.1N KMNO SUB4 AT PH 6.0-7.0 TO CO SUB2 AND H SUB2 O, AND THE EXCESS OF MNO SUB4 PRIME NEGATIVE IS AMPEROMETRICALLY TITRATED BY 0.05-0.1N MNSO SUB4 IN NA PYROPHOSPHATE MEDIUM AT PLUS 0.42 V. IF ACETALDEHYDE IS PRESENT, IT MUST BE REMOVED BY BUBBLING OF AIR.

UNCLASSIFIED

USSR

UDC 576.3:612.017:615.5

BUKHARIN, O. V., GERASIMOV, A. V., USVYATSOV, B. YA., and FROLOV, B. A.

"The Effect of Some Benzimidazole Derivatives on Protein Synthesis in Bacteria", pp 69-72, Sintez Belka i Rezistentnost' Kletok, (Proteins Synthesis and Cell Resistance), Leningrad, "Nauka," 1971, 104 pp

Abstract: The effect of benzimidazole derivatives on the frowth of Streptococci and Staphylococci and their cpacity to produce bacteriocins were studied. Intensification of protein synthesis in coccus bacteria under the influence of dibazole and metazole was noted. By means of small doses of these compounds it is possible to stimulate the growth and multiplication of bacteriocin-producing strains of Streptococci and Staphylococci. Dibazole and metazole in concentrations stimulating the growth of microbes increase the production of bacteriocin in bacteriocin-producing strains.

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USSR

UDC 51:621.391

NEMOLOCHNOV, O. F., USVYATSKIY, A. Ye.

"One Modification of the *-Algorithm of J. P. Roth for Production of Strict Boolean Function Implicants"

Avtomatiz. i Algoritmiz. Proyektir. Tsifr. Ustroystv. i Sistem. Ch. 1 [Automation and Algorithmization of Planning of Digital Devices and Systems, Part 1], Leningrad, 1971, pp 45-49, (Translated from Referativnyy Zhurnal, Kibernetika, No 6, 1971, Abstract No 6 V441).

Translation: A modification of the *-algorithm of Roth (see Voprosy Teorii Matematicheskikh Mashin [Problems of the Theory of Mathematical Machines -- Collection of Works], 1964) is suggested. Certain characteristics of its machine realization are presented.

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1/2 022 UNCLASSIFIED PROCESSING DATE--02OCT70

TITLE--THERMODYNAMIC FUNCTIONS OF SIX SUB2 YZ TYPE HALOSILANES -U-

AUTHOR-(05)-MASLOV, P.G., USVYATTSEVA, I.K., BOYKO, V.G., KARETNIKOVA, N.I., YENGALYCHEV, YU.S.

COUNTRY OF INFO--USSR

SOURCE--ZH. FIZ. KHIM. 1970, 44(3), 825

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY, PHYSICS

TOPIC TAGS--THERMODYNAMIC FUNCTION, SILANE, SILICON COMPOUND, GAS STATE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1993/0276

STEP NO--UR/0076/70/044/003/0825/0825

CIRC ACCESSION NO--AP0113206

UNCLASSIFIED

2/2 022 UNCLASSIFIED PROCESSING DATE--020CT70

CIRC ACCESSION NO--AP0113206

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. FORMULAS ARE DERIVED FOR THE CALCN. OF THERMODYNAMIC PROPERTIES OF 12 GASEOUS HALOSILANES SIX SUB2 YZ (X, Y, Z EQUAL F, CL, BR, I) AS FUNCTION OF TEMP. AND PRESSURE. THEY WERE OBTAINED BY THE METHOD REPORTED EARLIER (CA 64: 16715F). FORMULAS ARE VALID FOR C SUBRHODEGREES AND ENTHALPY (H TAUDEGREES MINUS H SUB0DEGREES) AT 250-10000EGREESK (ACCURACY 0.2-3PERCENT); AS WELL AS FOR ENTROPY AT 250-1500-20000EGREESK (ACCURACY 0.2-1.5DEGREES). VALUES OF COEFFS. IN THESE FORMULAS, ARE GIVEN. FACILITY: LENINGRAD, GOS. PEDAGOG. INST. IM. GERTSENA, LENINGRAD, USSR.

UNCLASSIFIED

USSR

UDC: 621.396.69:621.319.4

BELEN'KIY, B. P., US'YAROV, O. G.

"Designing Fuses for Pulse Capacitors"

Elektron. tekhnika. Nauchno-tekhn. sb. Radiodetali (Electronic Technology. Scientific and Technical Collection. Radio Components), 1970, vyp. 2 (19), pp 39-50 (from RZh-Radiotekhnika, No 1, Jan 71, Abstract No 1V288)

Translation: The paper presents the results of studies of fast-acting copper wire fuses designed for internal protection of pulse capacitors. A method is proposed for evaluating the speed of the fuses. Authors' abstract.

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USSR

UDC: 621.039.562.24

USYNIN, G. B., SHIBAYEV, V. A., and CHIRKOV, V. A.

"Stabilization of Specific Heat Release in A Fast Reactor Using Control Rods"

Moscow, Atomnaya energiya, Vol 31, no 1, Jul 71, pp 3-6

Abstract: The efficiency of fuel elements in a fast reactor depends largely on their temperature. The maximum load is generally concentrated on the fuel element casing. The reduction of the latter's temperature while maintaining the mean coolant temperature constant is therefore of great significance. This can be accomplished by distributing the coolant consumption rate according to the heat release curve along the reactor's radius. In ideal hydraulic designs the individual cells are heated equally and the average heating over the reactor concurs with the maximum heating of the coolant. In practice, however, such situations never materialize. The responsible factors are detailed and mathematical treatment of this and other closely related problems is presented. It is

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USYNIN, G. B., et al, Atomnaya energiya, Vol 31, no 1, Jul 71, pp 3-6

believed that rearrangement of the compensator rods in closer proximity to the periphery of the active zone at a given optimal radius will produce a positive economic effect. (3 illustrations, 1 table, 3 biblio. references)

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USSR

UDC 621.039.526:621.039.516

USYNIN, G. B., and POLYANIN, L. N.

"Doppler Effect and Nuclear Safety of a Fast Reactor"

Moscow, Atomnaya Energiya, Vol 29, No 3, Sep 70, pp 216-218

Abstract: The presence of a negative Doppler effect in a fast reactor due to the temperature dependence of the interaction cross-section of neutrons with nuclei of the fuel has a compensating effect on sudden reactivity changes resulting, for example, from the start of sodium boiling in the core. If there is not a sufficiently rapid feedback between the power increase which occurs and reactivity, this leads to reactor runaway. Two factors characterizing the action of the Doppler effect in reactivity perturbations are considered, viz. the delay time for this effect relative to a change in the neutron density is estimated and the effect of heterogeneity of the fuel composition on the magnitude of the Doppler effect is considered.

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Converters

USSR

UDC 621.396.622.23:778.53

USYSHKIN, Ye. I., PASUKHINA, M. G.

"Thyristor Frequency Converter for Film Camera Voltage Supply in Nature Shooting"

Moscow, Tekhnika kino i televideniya, No. 6, 1971, pp 9-12

Abstract: The authors, members of the All-Union Scientific Research Kinofotoinstitute, assert that the frequency converter described in this article will help solve the problem of independent power supplies for low-noise synchronous electrical drive in cinema cameras. The device was developed by the Institute with which the authors are associated, in collaboration with the TsKEK /expansion unknown/ and has the double function of supplying power to the synchronous film-shooting equipment and to the sound-recording equipment. It is light in weight, comparatively noiseless, capable of use on automobiles or boats, and adaptable to the 60-Hz supply lines of foreign countries. A complete schematic is given plus the technical specifications of the instrument. A photograph is also supplied. The instrument underwent testing at the Gorkiy Film Studios, conducted by S. A. Baranov and B. I. Shishkin, to whom the authors express their gratitude.

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1/2 017 UNCLASSIFIED *PROCESSING DATE--27NOV70

TITLE--NON CANONICAL TERMS IN EQUAL TIME CURRENT COMMUTATORS -U-

AUTHOR--USYUKINA, N.I.

COUNTRY OF INFO--USSR

SOURCE--TEORETICHESKAYA I MATEMATICHESKAYA FIZIKA, 1970, VOL 3, NR 2, PP 228-239

DATE PUBLISHED-------70

SUBJECT AREAS--MATHEMATICAL SCIENCES, PHYSICS

TOPIC TAGS--PERTURBATION THEORY, NUCLEON INTERACTION, MATRIX ELEMENT

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3003/1123 STEP NO--UR/0646/70/003/002/0228/0239

CIRC ACCESSION NO--AP0130156

UNCLASSIFIED

2/2 017 UNCLASSIFIED PROCESSING DATE--27NOV70

CIRC ACCESSION NO--AP0130156

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE MATRIX ELEMENTS FOR THE EQUAL TIME COMMUTATORS OF THE CONSERVING ISOVECTOR CURRENT BETWEEN ONE NUCLEON STATES AT ZERO MOMENTUM TRANSFER ARE CONSIDERED FOR A CLASS OR RENORMALIZABLE MODELS OF PERTURBATION THEORY. THE EXPRESSIONS ARE OBTAINED FOR THE NON CANONICAL TERMS ANTISYMMETRICAL IN THE ISOTOPIC INDICES.

UNCLASSIFIED

USSR

UDC 622.248.67

BEZUMOV, V. V., MOCHALOV, V. F., and UTEBAYEV, B. K.

"Cutting a New Shaft in Well SG-2 -- Biikzhal at a Depth of 4985 Meters"

Moscow, Bureniye, No 9, 1972, pp 9-12

Abstract: A detailed description is given of the drilling of a new shaft at a depth of 4895 meters in well SG-2 Biikzhal, with the aim of effecting the greatest possible avoidance, by the new shaft, of the zone of a complication present in the interval between 5060 and 5553 meters. Successful cutting of the new shaft was facilitated by the employment of ball-pivot turbine deflector and a single-cutter bit. 2 figures. 1 table.

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Information Theory

USSR

UDC: 621.374.32(088.8)

KOROLEV, V. F., UTEKHIN, A. P.

"A Difference Calculator"

USSR Author's Certificate No 268017, filed 14 Feb 69, published 31 Jul 70 (from RZh-Radiotekhnika, No 2, Feb 71, Abstract No 2G302 P)

Translation: This Author's Certificate introduces a difference calculator which contains a memory circuit of n decade counters connected in series through keys and a conversion module made up of a buffer decade counter and an indexed decade counter, flip-flops, keys, spacing circuits, a difference sign circuit and a program selector. To provide for the possibility of operation on a single counter input, to simplify both the difference device and the data output unit, and to reduce power consumption, the device contains a digital place selector with inputs connected to the program selector and to the output of the indexed decade counter, while the outputs of the digital place selector are connected to the spacing circuit, to the coupling key between the input of the device and the decade counter of the memory circuit, and also to the coupling switches between decade counters. The difference sign circuit connects to the output of the memory circuit and to the coupling keys between the decade counters of the memory circuit, and also to the control pulse spacing circuit and to the program selector which is coupled to the keys of the conversion module.

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USSR

UDC 612.013.1.014.43.014.461

POKROVSKIY, V. I., BULYCHEV, V. V., LISYKOV, T. Ye., MALEYEV, V. V., UTEKHIN, V. A., CHERNAYEVA, T. Ye., MAYOROV, Yu. M., MILOVIDOVA, S. S., and KAFAROV, K. A., Central Department of Infectious Pathology, Scientific Research imeni N. N. Pirogova, Institute of Epidemiology, Ministry of Health USSR, and chair of Hospital Therapy, Evening Faculty, Second Moscow Medical Institute, and Chair of Hygiene, State Central Institute for Physical Culture

"Effect of Dehydration and Hyperthermia on Homeostasis in Healthy Persons"

Moscow, Sovetskaya Meditsina, No 2, 1973, pp 27-31

Abstract: Blood chemistry and cardiovascular changes were studied in 20 healthy males aged 18 to 32 before and after staying various lengths of time in a sauna bath (15 to 30 and 35 to 55 minutes of exposure to temperatures of 80 to 100° and humidity of 8%). In those who remained in the sauna 15 to 30 minutes, hyperthermia resulted in hyperfunction of the heart, slowing of the blood flow, elevation of the pH and pressure of venous blood, increase in serum proteins and in the specific gravity and viscosity of blood, decrease in clotting time, loss of chlorine and potassium. In the group that remained in the sauna over 35 minutes, dehydration caused a loss of electrolytes (chiefly chlorine and potassium) with urine, cardiac hypofunction, slowing of the blood

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POKROVSKIY, V. I., et al., Sovetskaya Meditsina, No 2, 1973, pp 27-31

flow, decrease in venous and arterial blood pressure, shortening of clotting time, and increase in blood proteins, specific gravity, viscosity, and pH. The biochemical changes in both groups were within physiological limits and had no lasting effects. These findings can be used to determine disruptions of homeostasis, evaluate alterations in water-salt metabolism, acid-base equilibrium, etc. in infectious patients, and assess the efficacy of therapy, particularly in gastrointestinal diseases.

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